

ANNALS
OF
OTOLOGY, RHINOLOGY,
AND
LARYNGOLOGY.

VOL. XII.

MARCH.

No. 1.

I.

PERITONSILLAR ABSCESES.*

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The title of this paper should perhaps be the location of pus in the peritonsillar abscess, since it is to that portion of the subject that particular attention is directed.

If we look over the text-books we find but little attention directed to the anatomy of the peritonsillar tissue, and are usually simply told that pus forms in the tissues surrounding the tonsils. What the origin of the pus is, we are not told definitely; some authors holding that it originates in the peritonsillar tissue in the same way as an abscess in other parts of the body, while some assert that it is due to the entrance of streptococci from the tonsils. The antecedent acute tonsillitis is denied by some and affirmed by others, but the trend of modern opinion is in favor of this belief. That acute tonsillitis is often the precursor of quinsy, the author as well as many others has often observed. That peritonsillar abscess

*Read at the meeting of the Eastern Section of the American Laryngological, Rhinological and Otological Society, in New York, 1902.

may show no signs of lacunar inflammation is also a common observation; but it is reasonable to believe that if the chain of evidence has been observed in which peritonsillar abscess follows acute tonsillitis, such a source of infection is the usual one and that infection, if not obvious, must have occurred, even if all traces have disappeared at the time of the exam-



Fig. 1.

Injection through the Tonsil into the Pharyngo-Maxillary Space
Showing its Relation to the Anatomy of Peritonsillar Abscess.

ination. Goodale's researches on the absorption by the tonsil of carmine and other extraneous substances render it probable that germs enter with as great or greater facility into the peritonsillar tissue.

If we study the anatomy of the peritonsillar tissue with reference to its limits as a pus-containing cavity, we find that

the tonsil is situated in a groove formed by the posterior pillar behind, the anterior in front, and externally the fascia of the superior constrictor of the pharynx, to which the tonsil is often closely adherent. Externally is a space alluded to by the anatomists as the pharyngo-maxillary fossa. This space will be described later, but at present it is sufficient to



Fig. 2.

say that the inner wall is composed of pharyngeal aponeurosis already alluded to, on which the tonsil rests. The mucous membrane is reflected from anterior pillar to tonsil and from tonsil to posterior pillar forming by its passage in either direction a groove, shallow or deep, between the pillars and the tonsils.

Especially above the tonsil is the reflection of the mucous

membrane interesting, since it descends deep into the neck between the pillars and above the tonsil a far greater distance than would be supposed. Under this mucous membrane, between it and the pillars, is a variable amount of loose connective tissue, and in places lymphatic or adenoid remains.

There are then three places in which pus formed during peritonsillar abscesses may be enclosed: 1st, the pharyngo-maxillary fossa; 2nd, the supra-tonsillar fossa; 3rd, the loose

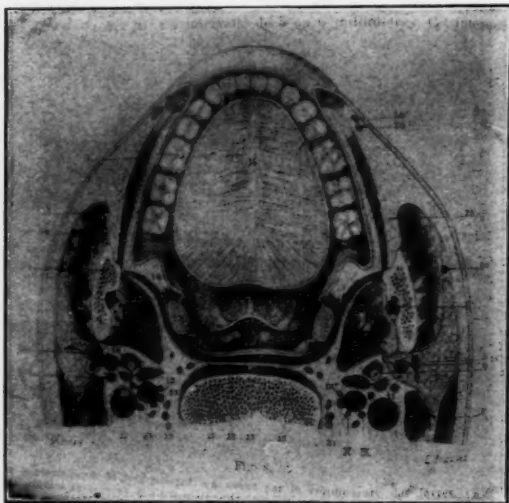


Fig. 3.

connective tissue underneath the mucous membrane surrounding tonsil or fossa. These three possible locations will be described in detail.

First, the pharyngo-maxillary fossa, suggested by Chiari of Vienna as the possible seat of suppuration, is a cavity filled with loose connective tissue, bounded externally by the pterygoid muscle, internally by the aponeurosis of the superior constrictor of the pharynx, which carries, on its inner or

throat side, the tonsil. This cavity is divided into two portions by the stylo-pharyngeus and stylo-glossus muscles and their aponeuroses. The posterior portion contains the large vessels of the neck, while the anterior contains only fat and connective tissues, and is in relation with the tonsil through interposition of the pharyngeal constrictor. It is evident that if pus filled the anterior portion of this cavity it would push the tonsil forward and inward and give us one of the symp-



Fig. 4.

toms of peritonsillar abscess. Chiari claims that the division between the anterior and posterior portions of the cavity is sufficiently strong to prevent the pus, in ordinary cases, from entering the posterior portion and so passing down along the sheath of the great vessels into the chest. The usual termination of the peritonsillar abscess is of course discharge into the throat; but there are several cases on record where pus has found its way into the chest, causing empyema and death.

Reference to the photograph made for me by Dr. Mosier

of plates taken from Testut's book will show the anatomical situation of the pharyngo-maxillary fossa in the normal state. In order to ascertain the form of the fossa when dilated, Dr. Mosier and I injected the cadaver with warm wax, entering the needle at a point below the angle of the jaw, so as to bring the point within the pharyngo-maxillary space. After filling the cavity with wax as thoroughly as possible, we examined the throat and found an appearance closely



Fig. 5.

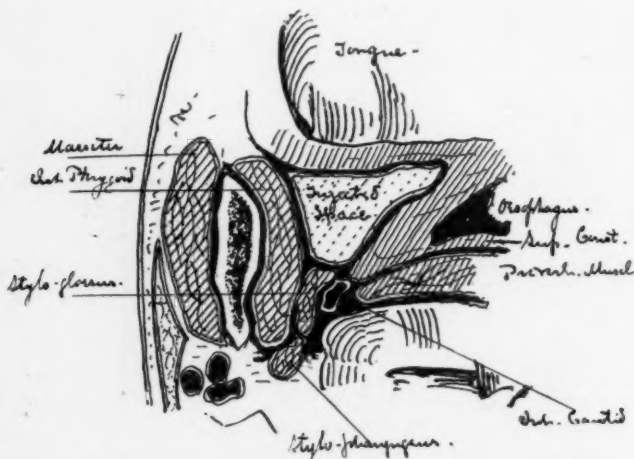
resembling that of a clinical peritonsillar abscess, the uvula, tonsil and peritonsillar tissue being pushed inward as in quinsy. Horizontal sections were then made of the head just below the level of the hard palate, and photographs of the lower section taken. These photographs show the pharyngo-maxillary fossa dilated; in one case empty of the wax, in the other with the previously empty space filled with absorbent cotton, in order to produce sharper definition. It was found that the wax did not easily penetrate beyond the

stylo-glossus and stylo-pharyngeus muscle. It will be noted that, in order to reach the throat, pus must pass through the superior pharyngeal constrictor, which, even in the cadaver, is a strong muscle, and when dilated with blood in the living subject and swollen by the products of inflammation in the sufferer from peritonsillar abscess, would be a powerful barrier.

The supratonsillar fossa of His is next to be considered as a possible location. This fossa cannot be better described than in the anatomist's own words: He says—"In the fetus of four or five months, the free edge of the anterior pillar forms a three-cornered fold, the apex of which is lost in the velum, while the base by a broad attachment is inserted into the tongue. The posterior border of this plica triangularis covers a cavity which corresponds to the earlier groove between the second and third branchial prominences. Subsequently, the surface of the cavity swells and through the addition of adenoid tissue becomes the tonsil—a process which has already begun before birth.

In most cases the mucous membrane undergoes so general a process of folding and swelling that signs of the earlier cavity are hardly traceable in the tonsillar crypts. One can sometimes recognize the location of the plica only as a smooth surface covering the anterior face of the tonsil. In other cases, and they are not infrequent, we find the original condition of the locality little changed; that is a well-marked plica triangularis and as evident a fossa above the tonsil." I need not quote the author further, except to say that he has found the fossa running upward and outward above the tonsil as deep as one and one-half centimeters, and that the posterior boundary of the cavity is always the palato-pharyngeus and that this muscle separates it from the fossa of Rosenmueller. It is, of course, conceivable and possible that the supratonsillar fossa should be walled off by adhesions, and that one or more crypts discharge into it from the tonsil and start suppuration, which would give peritonsillar abscess. Should the tonsil fully fill the mouth of the fossa and become adherent to it, the same result might occur. The author has dissected the supratonsillar fossa and found in the few cases examined some instances of adhesions covering the mouth of

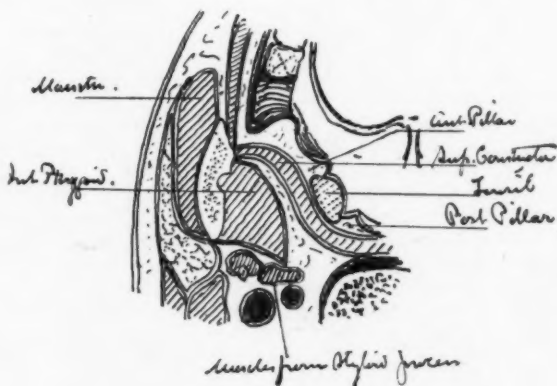
the fossa. Unfortunately, the fossa being larger at its mouth than at its upper and outer end, does not lend itself well to injection, so the distended appearance could not be compared with that of the pharyngo-maxillary fossa. The supratonsillar fossa has been found by some authors to contain detritus, and on the washing this out pus has been liberated and sore throat relieved. It is evident, therefore, that the supratonsillar fossa may be another possible location for pus in peritonsillar abscess, and its claims will be considered before the third possible location, the areolar



tissue about the tonsil, has been described. This areolar tissue is found at the base of the tonsil and beneath the mucous membrane, which is reflected from the pillars upon it. When we pull the tonsil inward with a tenaculum, we find it in most cases freely movable, and that it can be drawn for some distance from its bed, moving toward the centre of the throat, as a telescope is pulled out after being closed. This movement shows the body of the tonsil to be lying quite deeply between the pillars, its outer edge indicated beneath the palate as we move the inner edge about. The microscope shows the loose texture of the areolar tissue as well as

does the clinical effect just stated. It is, of course, plain that the filling of this tissue would force the tonsil inward and forward, as in peritonsillar abscess.

If we now attempt to diagnose clinically from the appearance, symptoms and results of puncture between the three pathologic conditions, we find that the assumption of the pharyngo-maxillary fossa as a location for pus is open to the following objections: First, the pus will probably empty more frequently into the chest than it does, having for that route less obstruction, viz.: the stylo-glossus and stylo-pharyngeus muscles to pass; while to make its exit into the



throat it has to pass through the aponeurosis of the superior constrictor and that muscle itself, which are more solid and strong than the styloid muscles mentioned. Second, that in puncturing any peritonsillar abscess between the anterior pillar and tonsil we often find a thin partition between us and the suppuration. It will be remembered that if the seat of pus were in the pharyngo-maxillary fossa we must pass through the superior constrictor to reach it. It would therefore require a deep puncture through thick muscle to reach the pus, which is often not the case. Third, if we consult the photograph of the distended pharyngo-maxillary fossa, we see that the cavity has its apex inward, while its broad base looks outward toward the ramus of the jaw. If we

remove a tonsil during peritonsillar abscess, we find ourselves looking into a fossa which is almost cone-shaped, with the base toward the uvula and the apex directed toward the jaw. These four points are sufficient in my opinion to determine us against the pharyngo-maxillary fossa as a location for the abscess.

We now come to the supratonsillar fossa. Here the diagnosis is more difficult. It seems to me evident that, first, if pus filled the supratonsillar fossa it would push the tonsil downward, since the fossa is above the tonsil, and outward, as soon as the palate begins to overlap the tonsil. In peritonsillar abscess we find the tonsil pushed inward toward the center of the throat, and usually not pushed downward. Second, in my experience pus is most frequently found anterior to the tonsil along its upper third. Third, unless hindered by adhesions we should be able to enter the fossa with a probe without cutting the mucous membrane, and so liberate the pus, which is not true. Fourth, if the pus in peritonsillar abscess is located in the supratonsillar fossa, we should never be able to enter that fossa without liberating pus. But in several cases I have been able to enter it during peritonsillar abscess without getting pus. Fifth, in the cases mentioned, in which the tonsil has been removed or partially removed during peritonsillar abscess, we find pus below the lower half of the tonsil; while if in the supratonsillar fossa it would be located above the tonsil.

We have remaining the areolar tissue about the tonsil, which can be examined through the microscope adhering to the tonsil after its removal. The great motility of the tonsil when not inflamed shows its loose and elastic tissue. If it is true that pus occupies in ordinary peritonsillar cases neither the pharyngo-maxillary nor the supratonsillar fossa, then it must be confined to the areolar tissue about the tonsil. Clinically, too, there is justification in Moure's classification of the antero-superior, postero-superior and external peritonsillar abscess, a classification based upon the clinical appearance of the abscess and on the fact that pus appears and is obtained anterior, posterior and external to the tonsil. Fourth, if the appearance of peritonsillar abscess were always the same, it would be an argument for pharyngo-maxillary or supratonsillar fossa, which are defined cavities, whereas if pus is anterior to the tonsil in one case, posterior to it in another and external to it in a third, it seems more likely that pus is confined in different cavities, holding different relations to the tonsil. Clinically, in most cases we find pus between anterior pillar and tonsil, more rarely between posterior pillar and tonsil, and seldom external to the tonsil itself.

In puncture of peritonsillar abscess the location of pus becomes important. We should not forget that the tonsil lies as a rule quite deep between the pillars, so that if we puncture in the location advised by most authors, that is in a line between the uvula and the wisdom tooth, we run the risk of puncturing the tonsil instead of the abscess. This is probably the reason why so many punctures of peritonsillar abscesses are failures. On the other hand, if we incise between anterior pillar and tonsil in the antero-superior variety, or between posterior pillar and tonsil in the posterior variety, we pass along the axis of the tonsil and reach pus as soon as we have crossed its outer border. We are warned in the text-books of the danger of injuring the great vessels by this procedure. I believe these fears are unwarranted and that the measurements made on the cadaver do not take into account the pathologic conditions existing at the time of puncture. In antero-superior cases I have taken pains to measure the distance from the palate to the posterior wall of the cavity, which is the posterior pillar of the fauces. This depth has been found to be one and one-fourth to one and one-half inches; so that a puncture of an inch in length in an outward direction is quite safe. As will be seen by the photograph taken from Testut's book, the vessels lie in a plane posterior to one passed through both posterior pillars. In cases of postero-superior abscess a right-angled knife should be used and carried above and behind the tonsil; in external, the incision can be made as in anterior, but with more care as to depth of incision. These latter cases, if allowed a day or two to mature, will become anterior or posterior, in my opinion.

I have not dwelt on symptoms, prognosis or treatment, except incision, since these are fully treated in text-books. One word as to prevention of recurrence. If the tonsil is removed by dissection during peritonsillar abscess so as to throw open the abscess cavity, recurrence can be avoided in the great majority of cases. I have records of patients so operated upon in which no recurrence had taken place in periods varying from one to five years.

To summarize: Three locations have been claimed as possible situations of peritonsillar abscess. First, the pharyngo-maxillary fossa; second, the supratonsillar fossa; and third, the areolar tissue about the tonsil. From the anatomic conditions and the clinical appearances, the site of the abscess is believed to be the areolar tissue. The incisions used are an upward and backward one, using a straight knife, for antero-superior cases; while for postero-superior an outward incision between posterior pillar and tonsil, with a right-angled knife, is advised.

II.

REPORT OF A CASE OF LARGE CEREBRAL ABSCESS OCCURRING DURING THE COURSE OF AN ACUTE SUPPURATION OF THE MIDDLE EAR. OPERATION. RECOVERY.

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Mrs. R. A., age 40, of Indianapolis, consulted me at my office, July 26, 1902, complaining of severe earache in the right ear. The membrana tympani was intensely engorged and red though not bulging. I applied a hot tampon of carbolyzed glycerine to the bottom of the external meatus and against the drum membrane, gave a saline purge, prescribed an anodyne for internal use if necessary, and gave instructions to use the hot water bottle constantly on reaching home. She reported next day at my office that she had suffered greatly since the last visit. Inspection of the fundus of the ear showed the drum head much inflamed and bulging, and I therefore made an extensive paracentesis. There was a distinct snapping sound when the knife perforated the membrane, an escape of gases, and an unusually large amount of serum drainage. The meatus was packed loosely with bichloride gauze, and the patient kept in my office for an hour with an electric heater over the ear. During this time sufficient serum poured out to saturate the gauze and trickle down the patient's neck. I predicted that she would have a comfortable night, but the suffering continued but little if any less than before the paracentesis.

I was away from the city the three days following, during

which time Dr. B. A. Brown, the family physician, was called and made every effort to relieve the suffering, but without success. I next saw the patient about Aug. 10, finding her in bed and exhibiting every evidence of having undergone very great suffering. The pain was not so much around or in the depths of the ear as it was over the temple at the outer angle of the supra-orbital ridge, and was in many ways much like a facial neuralgia, of which the patient had often severely suffered. The ear was discharging freely and the perforation I had made was giving sufficient drainage. There was no tenderness over the mastoid, no fever and no circulatory disturbance. Dr. Brown and I were both of the opinion that there must be a neuralgic element in the case, and we therefore treated it as such for several days without the slightest benefit. Aug. 18 the patient had been sleepless for some days on account of pain, and there was a very little tenderness over the mastoid, but no discoloration or swelling. The very profuse aural discharge, the character and continuance of the pain and the history of the case led me to think that there might be mastoid involvement. I had seen and operated upon some cases of mastoiditis in which the pain and other symptoms were obscure, although not approaching the obscurity of the case in hand, but in which operation had proven a collection of pus to be present. After a thorough examination of every feature of the situation we decided that an exploration of the mastoid antrum and cells was indicated, and accordingly the next morning this was done, Drs. B. A. Brown and Frank Berry assisting. The mastoid cells were filled with pus and the whole were ablated. The mastoid antrum was entered and its walls inspected, but was nowhere found to be necrotic, and contained no pus. I had at the time no doubt but that this operation would end in speedy recovery, but was a second time disappointed, for the patient continued to suffer just as before.

On the third day following the mastoid operation, Dr. Brown reported that in lifting a tablet to her mouth, Mrs. A. was observed to be halting and uncertain in the movements of her left arm and hand. This remained about the same for a day, but on August 22, there was complete paralysis of the left hand and arm, and paresis of the leg on the same side.

The pupil of the right eye was very greatly enlarged, the pulse was 60, the temperature normal, there was frequent bilious vomiting, and patient so insensible as to recognize nothing about her. Dr. Brown and I perfectly agreed that there was brain abscess, and asked to have Dr. Wm. Chas. White called to locate the situation in the brain, so that operation might be the more wisely performed. Dr. White gave it as his opinion that the abscess was located in the temporal lobe, two or more inches above the external meatus.*

The family consenting to a second operation, this was undertaken August 23, Drs. Brown, White and Little assisting. The patient was at this time in such a comatose state that the whole of one side of the head was scrubbed and shaved without her knowledge. The former mastoid wound was opened, disinfected, and then the tegmen antri was chiseled away over a large enough area to expose a square inch of duramater, which showed little or no disease. The wound was then extended into the temporal region, and a button of bone removed from the squama, one and one-half inches above the tegmen antri. The dura was ash colored and bulged through the opening at once. When incised its inner surface was found covered with thick pus, but not in sufficient quantity to flow out. A bistoury was used to explore the brain, and the first incision directed inwardly, struck the abscess, which was under sufficient pressure to squirt its contents a foot into the air. Thus escaping it was impossible to measure the quantity, but I believe a very low estimate was four ounces, and the cavity left in the cranium after it was all evacuated seemed to include a considerable part of the contents of the skull. The lowest part of the cavity was connected with the opening through the tegmen antri, a rubber drainage tube was inserted into the upper opening and brought out through the lower, and the whole then gently flushed with normal salt solution. A strip of iodoform gauze was also carried by the side of the tube, but this was removed on the second day.

The improvement was immediate, and recovery took place without a single unpleasant symptom. Intelligence and the

*Prof. White's notes and opinions of the case are appended.

use of the paralyzed parts returned as soon as the effects of the anesthetic wore off. The neuralgic pain disappeared at once, appetite returned, and the patient was joking with her attendants within three days. The pulse rose to normal, and at no time was the temperature above $99\frac{1}{2}$ F.

The drainage tube was allowed to remain four days, and during this time the cavity was gently washed with normal saline solution. The upper opening was then allowed to close, but a strip of gauze was kept in the lower for a week longer.

Intra-dural abscess is far more frequently met with during a chronic than during an acute middle ear suppuration. In this case the infection had undoubtedly been carried to the brain through the vascular channels, since there was no indication anywhere of the tegmen antri or tympani having become necrotic.

The patient* now (March 1, 1903) feels better than for several years, is entirely free from pain, hears almost normally in the affected ear, there is no discharge, and she is much heavier than before her illness.

Dr. White's report of the case is as follows:

I saw the patient first with Dr. Barnhill on the evening before the operation, and she was then in the following condition. In these notes only those features referring directly to the location of the abscess will be given, since diagnosis of abscess of the brain had already been made.

The patient was lying upon her back oblivious to her surroundings. On careful examination the left side of the face was found to be flatter and the lines were less distinct than on the right side. The left corner of the mouth, and left outer canthus of the eye drooped a little more than the right one; and the left cheek moved more in respiration than the right; and the left side of the body was more or less paralyzed, falling to the bed heavily when raised, and yet resisting somewhat passive movements, especially the arm. The left pupil still reacted to light. The right one was widely dilated and inactive, and there was a well marked lateral nystagmus. Upon repeatedly requesting the patient to move her left arm, or protrude her tongue she would still make some attempt to do so. The tongue had a tendency to protrude toward the left side. The repeating of the request might be looked upon in the light of increasing the stimulus until the requisite degree was reached to arouse the cerebral cells to action. The leg was more disabled than the arm, and sensation was quite in abeyance over the whole left side.

*The patient was exhibited at a meeting of the Indianapolis Medical Society, December, 1902.

The knee jerk and triceps jerk on the left side were markedly exaggerated, and there were also present an ankle clonus and distinct Babinsky reflex (i. e. an extensor reflex of the great toe on plantar irritation) on the same side.

The reflexes and sensation on the right side were not affected, and the right limbs were moved on request and resisted passive movement.

From (a) the completeness of the hemiplegia; (b) the retained and increased spinal reflexes; (c) the newly acquired reflexes, i. e., the clonus and extensor reflex of the great toe, we had to do with a lesion affecting the upper group of neurones, those leading from the cortex on the side opposite the paralysis to the nuclei of the peripheral nerves on the same side as the paralysis in the medulla and spine, and further in such position as to control the whole group, and also the group conducting the sensation from the left side cerebral-wards, i. e., those of the internal capsule; still from the partial retention of cerebral control over the lower motor or peripheral group of neurones as evidenced by the patient's response to repeated commands, the lesion was not one destroying the continuity of the upper cerebral group. Again, the paralyzed side being made quiet, the lesion was evidently not a cortical lesion alone at least, and it was in its progressive period, the paralysis increasing in degree as the hours passed.

The lesion was then cerebral, subcortical and not invading the Rolandic area in such a way as to produce a rhexis of the axis cylinders of the upper neurone group, but nevertheless increasing in its power over their function. It must in other words hold them in abeyance by pressure upon them.

From (a) the loss of the patient's interest in her surroundings a function ascribed to the posterior silent area of the hemisphere, (b) the differing degree of intensity with which the neurone groups were affected, namely: in order of intensity, sensation, lower extremity and face, (c) the old mastoid trouble which, however, had not broken through, this pressure must come from behind.

That is, the abscess must be in the right parietal lobe behind the post central convolution and behind the auditory word center in the posterior portion of the superior temporo-sphenoidal convolution, and yet high enough and forward enough to exert a considerable pressure on the axis cylinder processes from these regions, the only place for us to place it, then being beneath the angular gyrus, the supramarginal convolution and the posterior one-fifth of the superior temporo-sphenoidal convolution, or beneath a point on the skull one inch behind the external auditory meatus, and one inch above it on a line at right angles to Reid's base line.

III.

PACHYDERMIA AND CARCINOMA, WITH REMARKS ON THE DEVELOPMENT AND THE MICROSCOPIC DIAGNOSIS OF CARCINOMA.*

BY PROF. B. FRAENKEL, BERLIN.

TRANSLATED BY

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The basis for what I wish to communicate to you is found in the clinical histories of two patients. CASE I. On the 27th of March, 1897, Mr. K. accompanied by a colleague consulted me. The patient had been sent to me by Dr. O. Brieger of Breslau. Dr. O. Brieger had observed the patient for some time with me. Mr. K. showed in addition to extensive redening and swelling of the vocal cords, a swelling of the size of a pea on his right processus vocalis which was attached somewhat subglottically. The growth had no pedicle, but otherwise gave accurately the appearance of a pachydermic swelling. I ordered the iodides and had the opportunity of seeing the patient several times during the next month. The swelling seemed to become smaller rather than to grow larger, and was pronounced by all who saw it to be pachydermia.

In June he went to Ems for the cure where he was treated by Dr. Aronsohn. When I again saw him, June 25, 1897, the growth showed a decidedly changed form. It did not reach as far superficially into the lumen but had decidedly increased in size posteriorly and downward. The growth now filled the subglottic region and the free edge and surface of the vocal cord from the posterior to the anterior third. Its surface was uneven. It could be seen that it had also advanced into the surrounding tissue. I removed at that time with the cutting forceps a section of the tumor. Microscopic ex-

*Archiv. für Laryngologie und Rhinologie, 1902.

amination gave atypical nests which pressed far into the connective tissue, in places without distinct boundaries, with irregular mitoses but without pearls, a condition accordingly which, if it was not altogether conclusive for carcinoma, was suspicious in a high degree. In accord with my other conferees it was now determined to remove the growth and the



Fig. 1.



Fig. 2.

attempt was first made to accomplish this endolaryngeally.

I succeeded on the 16th of August in accomplishing the entire removal in this manner. A local recurrence, however, soon took place. On September 20th I noted the following appearances. The free edge of the right vocal cord was attacked by a white, uneven tumor. Anteriorly but five

mm. of the cord remained free, but posteriorly the growth was not as pronounced as originally. The hyaline portion of the processus vocalis was free, but at the base of the processus a small, red nodule could be noticed, isolated from the rest of the tumor. Superiorly the tumor reached to the middle of the visible surface of the vocal cord, inferiorly the boundary could not be clearly seen. In any case it reached far into the subglottic region. Again the impression



Plate I.

was given that the growth had worked its way into the surrounding tissue. In several spots superficial ulceration could be detected. I removed for a second time a section for examination. This showed now undoubted carcinoma, i. e., isolated epithelial islets and numerous pearls. I accordingly recommended laryngofissure. This was performed on the 21st of September, 1897, by Dr. G. Hahn; introduction of the sponge cannula, splitting of the cricoid and thyroid cartilages, extirpation of the vocal cord, including the pro-

cessu; vocalis. After the operation the sponge cannula was exchanged for an ordinary one, the latter being removed the next day; no stitches and no sutures; healing through granulation. In May, 1898, I had the opportunity of again seeing the patient. A tumor was seen upon the cicatrices which ran anteriorly from right to left. This was the size of a large bean and filled on both sides

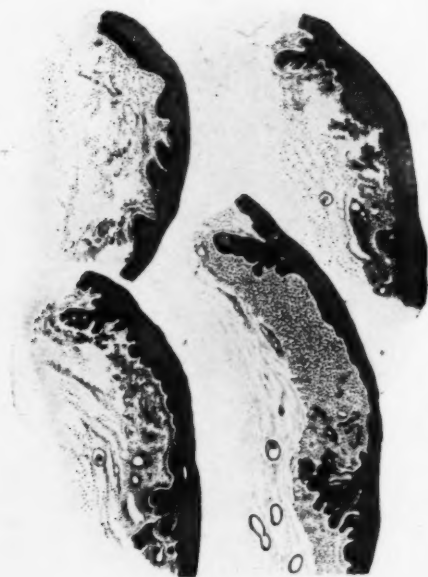


Plate II.

the anterior commissure, but was inserted on the right. It reached down into the subglottic space and prevented the left cord from approximating the mass which had taken the place of the extirpated right cord. As a result, marked hoarseness was again present. I was successful on the 13th day of May in removing the growth at one sitting. The microscopic examination showed that we had to do with a

simple granuloma, for the growth consisted entirely of loose connective tissue, without showing a single trace in its interior, of any epithelial nests. Since that time the patient has remained entirely well. At the site of his right vocal cord a swelling has formed which is similar to the vocal cord as it appears in the cadaver position. Where the tracheal cannula had been introduced, a spur is visible which reaches anteriorly. The voice is very good. I last had an oppor-



Plate III.

tunity of examining the patient on the 15th of March, 1902. Cicatrical growth, which had taken the place of the extirpated cord has now so far advanced that it presents the appearance of a true vocal cord and would be regarded as such by those who do not know the history. The vocal cord removed at the operation was cut microscopically by Dr. Alexander. Figures 1 and 2 show sections through the region in which the ulceration was especially marked. The

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loss of substance is limited to the epithelium. The nests show in places typical pearls. From one of these, as for example the large one in figure 2, there might be some doubt whether it was a case of pachydermia or cancer, if in other places the appearance did not give the most positive signs of carcinoma.

Deeper in the connective tissue an isolated epithelial island could be seen which shows no connection in any of the re-



Plate IV.

maining sections with the nests. Connective tissue infiltration is recognizable in the region adjacent to the cancer in a marked degree.

CASE II. Dr. Croft, sanatorium director, sixty-four years old, consulted me on the 25th of July, 1900. He complained of hoarseness which had annoyed him since April and to which later had been added a sensation of suffocation. I found in addition to a rhinitis hyperplastica, both vocal cords greatly

reddened, opaque and thickened. On the right processus vocalis small nodules were seen and in the middle third of the right vocal cord a node of the size of a pea was attached sub-glottically, similar in color and appearance to the surrounding mucous membrane. This was attached by a broad base. I made the diagnosis of pachydermia diffusa with node formation and ordered tincture of iodine. The 29th of September,



Plate V.

1901, Dr. Croft again consulted me. The condition was entirely unchanged since the 29th of July except that the sub-glottic node had plainly increased in size. I removed a piece with the Scheinmann forceps which showed the tumor to be hard. The microscopic examination of the removed piece gave now the signs of carcinoma.

Figures 1 and 2, plate I, show a section through this. Superficially the epithelium is markedly thickened. While the

superficial layers are cornified in places, in spots the regular structure is not recognizable and the boundaries toward the connective tissue are obliterated or less clearly defined than in the normal state. The connective tissue itself seemed infiltrated and in places invaded by epithelial formations. These in part stand in direct connection with the surface epithelium. In part they are represented as islands surrounded by connective tissue. The latter are particularly round while the nests

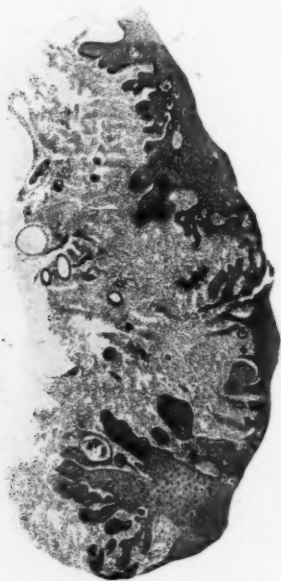


Plate VI.

standing in close connection with the surface are many shaped, but both the nests and the islands reach far into the connective tissue. In the superficial epithelium ducts lined with endothelium and many formed mitoses are found, which appear also in the nests and in the islands. In one of the nests found in the middle of the slide, pearls are seen and in close proximity structures of which one could be in doubt whether they should be regarded as many nucleated giant

cells or cells melted together into a conglomerate formation. Figure 2 give these nests considerably enlarged. Similar appearances were also found in the other sections, especially pearls. Since the result of the microscopic examination seemed beyond question and it was scarcely possible to remove the growth on account of its subglottic situation endolaryngeally, I advised my confrere to submit to the laryngo-



Plate VII.

fissure. This was performed on the ninth of November by Prof. Gluck. After an introduction of the sponge cannula, the cricoid and the thyroid cartilages were split open in the median line and the right vocal cord removed. The course of the healing was uneventful. The patient soon began to swallow and visited me fourteen days after the operation. As a result of the operation adhesions formed in the anterior commissure from right to left. The voice was as good as be-

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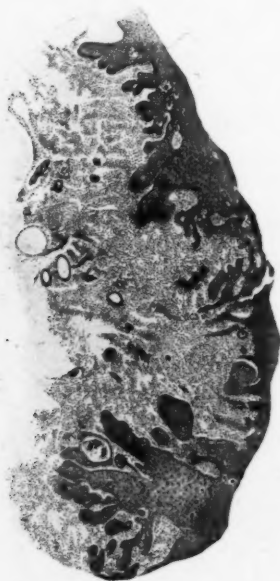


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fore the operation. On the 20th of August I satisfied myself of the excellent condition of the patient, although to be sure the left vocal cord was still thick and red. The patient died on the first of March 1902, in the surgical division of the Friedrichshain Hospital.

The clinical history of the disease causing his death was one of stricture of the intestines, due to cancer of the colon. The microscopic examination of the portions of the intestines re-



Plate VIII.

moved at the time of the operation, showed adenocarcinoma with transitional change into cylindrical cancer. There existed, therefore, the primary cancer of the intestine and the condition several times observed, but still very rare, was present of one person being attacked by two separate carcinomas. Prof. Hanseemann had the kindness to show me the microscopic section of the cancer of the intestines. He also performed the autopsy for me in a most commendable manner, on the second of March, 1902. He kindly permitted me to

examine the larynx. Figure 3 shows its inner surface. The cicatricial masses are visible which formed at the site of the extirpated right vocal cord and which extended from there to the left side. Looking from above, the diaphragm-like bridges in the anterior commissure which appeared in the laryngeal mirror are better seen. The white protuberance above the left vocal cord is an ecchondrosis which had arisen at the commissure of the thyroid cartilage after the opera-



Plate IX.

tion. Similar ecchondroses were found further down in the scar of the tracheotomy wound. These were situated upon the tracheal rings and gave rise to the spurs which are so often seen in the laryngoscopic examination of healed tracheotomies. This is, as far as I know, the first time that these structures had been demonstrated in the cadaver to be ecchondroses. The left vocal cord showed now in the hardened preparation a better defined border than I had observed in life. Traces of pachydermia can be seen at the right pro-

cessus vocalis; on the other hand the larynx is free from any suspicion of a return of the cancer.

On the ninth of November, 1901, the extirpated vocal cord was cut by the skilled hand of my assistant, Dr. A. Alexander, in a frontal direction into serial sections and imbedded on fifty-one cover glasses. These were, according to the Van Giesen method, numerically designated and colored with



Plate X.

picrocarmine. Altogether, 453 sections were made; cover glass 1, most posterior portion of the vocal cord, cover glass 51, most anterior portion. Changes are recognizable in the sections which I regard as pachydermia and others which I hold to be carcinoma. The latter give pictures in which we can follow as far as it is possible in the anatomic preparations, the developing stages of carcinoma in an exceptional manner. On this account I have had drawn a large number

of sections from the series in question. The drawings were done in an excellent manner by the painter, W. O. Haase, and are true to nature, even to the individual cells. Every reader of this article can follow my conclusions as if he examined the preparations in the microscope with his own eye. For comparison, I give in plates X and XI, such sections as in my opinion represent neither pachydermia nor cancer. Figure 1, plate II, represents preparations 2 to 9 of the cover



Plate XI.

glasses. One may notice epithelial thickening with nest formation. The connective tissue is but little infiltrated. The basal cells of the epithelium are in part fibrillated but are regularly arranged. Nothing in the preparation suggests that it represents a section through the mass of the vocal cord, of which a few cover glasses further on give the appearance of a carcinoma. Figure 2, plate II, shows the third preparation of the 11th cover glass. In this can be seen, below, epithelial

nests in the neighborhood of which the connective tissue is decidedly infiltrated. Here is the locality where the carcinoma developed. In this section also it is impossible to recognize it as such as yet. One would think rather, the upper nest which spreads itself in different directions was the malignant growth. This however is not the case. The upper nest remains free from cancer formation and serves as a diagnostic mark for the locality where the cancer develops.



Plate XII.

The large cell with karyokinesis which is found at the base of the nest, cannot be regarded of value for the diagnosis of carcinoma. I was unable either in this or in any of the following sections to discover any difference in the mitoses of the upper and lower nests. The blood vessels of the infiltrated connective tissue were somewhat dilated in the lower nests. Three sections further on, the lower nest begins to grow into the interior and sends out shoots. In the neighborhood, yet separated from it, (preparation 6, slide 11, fig-

ure 3, plate II) are found small epithelial islands. Not a trace was discoverable of separation of parts of the epithelium, such as Ribbert describes in the beginning of cancer formation. On the next, the 12th slide, appears the first clear sign of cancer formation. The lower nest is split into many processes which pass over in part without a sharp boundary into the connective tissue. A comparison of this boundary in this slide with those of the preceding drawings offers much of interest. Here we find for example above the nest, epithelial islands which have no connection with the nest or superficial epithelium. The blood vessels beneath the infiltrated connective tissue are decidedly dilated. Alteration in the form of the mitoses could not be discovered. Plate III is a panorama picture for the examination of the region of the vocal cord in which the changes in question take place. The 7th section of the 13th slide represents this. The processus vocalis is seen which still shows the hyaline cartilage. Changes in the anterior end of the cartilaginous portion of the vocal cord are also seen. The upper nest as well as the carcinoma can be plainly seen. Figure I, plate IV, shows this area under a higher power of the microscope.

The development of the cancer is shown still more plainly than in the earlier slides. That is to say, the growth of the tufts into the deeper parts are shown, and their obliterated boundary distinctly noticeable on the left side of the processus vocalis. In the following sections these changes come more and more into view as well as the epithelial island formation. Figure 2, plate IV, which represent the sixth section of slide 15, is also an example of this. The upper nest remains unchanged. In section 2, slide 17, which plate V represents, the diagnosis of cancer is no longer in doubt. In addition to the nest formation, epithelial islands are found in the anterior portion which have no connection with the superficial epithelium. The epithelium here shows altogether an atypical character. Cells press into the connective tissue which do not present the form of basal cells. The epithelium itself is for the most part increased in size and shows in places a division of the nuclei and mitoses as well as vacuoli. Important changes in the mitoses of the healthy parts of the slide cannot be recognized. Between the upper nests and

the carcinoma an epithelial nest is visible which later disappears.

Nowhere are there any appearances from which the positive conclusion could be drawn that this case is malignant. The cancer formation appears still more plainly in the following section. In this the pearl formation also is seen as in plate VI. slide 13 section 3, while plate VII, slide 21, section 2, shows epithelial islands and nests but no pearls. From here on just as in the earlier sections, the carcinoma gradually passes into the relatively healthy tissue. Plates VIII and IX, which represents section 2 and 6 of slide 23, will show this without further explanation. In the last section the surface epithelium is thin and in places not present. The remaining sections in my opinion represent pachydermia but there occur however, in places, peculiar appearances so that doubt easily can arise, whether cancer is not present in other spots also. I will refer to this question more at length later. There occur, for example, large nest formations which extend decidedly into the interior and send out daughter nests in different directions. These daughter nests are met in many sections and have no connection with the rest of the epithelium. If we go further into the series, the same connection is to be discovered. In many nests there occur pictures of cell division resembling in this way the appearance of glands. Again in other places a cavity has formed in the center which makes such nests resemble tubular glands, but everywhere there is a sharp differentiation from the connective tissue. The arrangement of the different forms of the epithelial cells, especially the basal cells, gives no considerable deviation from the normal structure.

The superficial layers are in places cornified. An active infiltration of the subepithelial connective tissue such as is present in the cancerous areas is nowhere discoverable. Small dilated blood vessels however occur in spots. The epithelial cells themselves are in places undergoing active nuclear division. There exist numerous mitoses and conglomerate cells which in places suggest pearl formation. The connective tissue shows hyaline degeneration in spots.

Plate X, represents 8 to 23 of the slides. In the lower nest karyokinesis is seen in the daughter cells. Below the

center, epithelial islands appear, pressing into deeper parts whose connection with the surface however, can be recognized, if we follow, the serial section further. The infiltration has definite boundaries. In the upper nests, in the part lying above the cleavage are seen large cells both anteriorly and in the deeper parts. Here also much splitting of the nucleus is recognizable. Plate XI, slide 41, preparation 1, shows the most anterior portion of the vocal cord. In the left upper part is seen an epithelial nest which has no connection with the surface. To the right appears a nest which resembles a tubular gland and three slides further on opens into the superficial epithelium as if by excretory duct.

When we extend these clinical observations in a critical manner there is no question that the first case is one of carcinoma. Both the laryngoscopic picture and the result of the microscopic examination are of one meaning as regards this. The first was that of a whitish growth showing loss of substance on the surface, situated on the right vocal cord, which had clearly advanced into the surrounding tissue. The microscopic examination showed epithelial islands with pearls deep in the connective tissue. At first one could perhaps be in doubt whether pachydermia had existed. The patient however showed reddened vocal cords, the epithelium of which was decidedly more opaque than normal. The unaffected left cord still shows pachydermia diffusa. No one can say with certainty whether the growth on the processus vocalis was to be considered pachydermia, or whether at the first examination on the 27th of March, 1897, was to be regarded as carcinoma. By everyone who had an opportunity to see him, including Dr. O. Brieger, Dr. Aronsohn and myself, it was diagnosed to be pachydermia. Further it did not recur after the endolaryngeal operation, but the growth proceeded directly from it and extended anteriorly. The positive evidence that cancer was present was first obtained by the recurrence which took place after the endolaryngeal removal, but this can in no wise be regarded as proof for the theory, we hope now entirely abandoned, that benign tumors can be transformed into malignant growth, through endolaryngeal operations. For the laryngoscopic picture and the pieces removed before the endolaryngeal operation had already

such a suspicious appearance as regards cancer that it was declared to be such by most physicians. Nothing was lacking except pearl formation to remove all doubt. The microscopic appearance prescribed imperatively its removal from the body as the proper therapeutic measure.

Recurrence took place from 16th of August to 30th of September. The patient stood the operation well and now is completely recovered and in possession of a voice not perfectly clear but still quite strong.

Very different is the second case. Here the clinical examination of the patient gives almost no aid in the diagnosis. On the right side of the larynx affected with pachydermia diffusa, a small nodule was observed subglottically and only a relatively rapid growth of the same gave us grounds to believe that something here was developing. The microscopic examination however, of the piece removed, left no doubt of the diagnosis of cancer.

We come then to a very important and debatable question, namely, that of the microscopic diagnosis of malignant growths.

Without wishing to exhaust the extensive literature of this subject, I would like to refer briefly to the chief phases of its development. More accurate information can be obtained in the authorities cited. Originally cancer was entirely a biologic conception. According to Johannes Mueller, through whose classical labors the anatomic ground work was laid, cancer was defined as follows: "All tumors in general can be called cancerous which attack the natural structure of all the tissues, which are from the outset constitutional or in the natural course of development become so, which are wont regularly to return after their extirpation and lead to the destruction of the patient." In this definition which all writers before Mueller adhere to, the finer anatomic examination is excluded in the diagnosis and as malignancy alone, i. e., the destruction of all tissues, metastatic formation, and finally the death of the individual, are made the signs of cancer, so all tumors which possess this malignancy whatever the character of the anatomic structure, were called cancer. In spite of this definition, the teaching of the finer anatomy of cancer begins with Mueller,

inasmuch as this great master shows that cancer consists of cells which are like other cells in the organism and in itself represents nothing foreign to the body.

On these grounds Virchow next showed that the component parts of cancer were epithelial cells. From the mass of malignant growths the conception of cancer was therefore limited to those whose parenchyma was made of epithelial cells. These epithelial cells are arranged according to Virchow in a particular manner, "They form alveoli," i. e., cavities which lie inside the diseased tissues and organs and are filled with cells of an epidermoid character. According to Virchow, therefore, the diagnostic sign of cancer consists in that the epithelium occurs heterotopically, in unsuitable places and shows an alveolar structure, i. e., a peculiar back ground or stroma, which gives it an arrangement analogous to glands but without any accompanying ducts.

An important step in the development of the anatomic study of cancer was made through the labors of Remak, Thiersch, and Waldeyer. Remak has declared that it is not admissible to regard epithelial cells as developing except from other epithelial cells. Thiersch showed in his studies that the cells of epithelial cancer developed out of the pre-existing cells of the healthy body. Waldeyer gave to this teaching still greater weight by the completeness of his individual observations. It is particularly interesting to look at Waldeyer's results in detail. I give here in a word his observations over the origin of cancer of the breast. This begins with a growth of epithelial cells in the acini themselves. For a long time even when the enlarged acini have reached already two or three times their natural size and have taken on all sorts of shapes, especially cylindrical and curved, a clear boundary is to be seen through the basal membrane,

To be sure the growth around the acini presses ever nearer the limiting membrane and the contour becomes ever more obliterated. Yet no one can be in doubt that it is still actually present. So far the new growth has not yet a characteristic appearance. With the further growth of the acini, however, which takes place the quicker in proportion as soft, young, less resisting connective tissue springs up around the pericinous growth, the clear boundary through the basal

membrane is lost. In place of acini we see now great epithelial masses piled up without definite typical form. In part there are large cylindrical tubes, in part round masses, here large and there small heaps. They present nowhere orderly arrangement, no where lumina are found but the entire alveolar space is filled with epithelial cells and thus we are, in my opinion, dealing with genuine cancer. The epithelial masses are still well separated from the small cell connective tissue growth. On the border of the large carcinomatous mass, as I have determined to name, these irregular collections of epithelial cells just described, the cells press closer together and have a short, round, cylindrical form as a result of which, under higher powers of the microscope, an optical boundary line is plainly visible. A true basal membrane is however no longer visible.

As for the mucous membrane and the outer skin, nests occur in place of the alveolar structure, which grow from the superficial epithelium into the depths of the tissue. But cancer also of the external surface takes its origin from the epithelium of the same. This conception regarding the origin of cancer from the preformed epithelium of the organism, is now generally regarded as correct. In the nomenclature, however, the terms of Virchow's theory still remain; for instance, we speak still of alveoli, although that which we now think of under this term no longer corresponds to a cavity which is filled with epithelium. The name which Waldeyer proposes, namely, carcinomatous bodies, has not gained general acceptance. The alveoli represent, as we must now admit, undefined areas of cancer growth. These stand in direct connection by means of more or less thick bands with the superficial epithelium or they are completely separated from it and represent then heterologic epithelial islands in the connective tissue which had their origin probably along the paths of the lymph stream, and take their rise through the individual movement of the emigrating and altered epithelial cells of the cancer. Such epithelial cells represent accordingly the beginning of metastatic formation, only they lie in close proximity to the original tumor. The second point in which the usual nomenclature has not followed the altered theories is the fact that we call, in cancer of the

external parts, the base of the cancer that which we now ought to properly call the apex. The base of the cancer lies in the superficial epithelium. Now it often occurs that this base is smaller than the largest diameter of the growth which can lie more or less deep in the tissue. That which we are wont to call the base, namely, the boundary portion toward the connective tissue, is always the newest part of the cancer. For a long time it was believed that we had in the demonstration of heterotopic epithelial nests, the anatomic expression for carcinoma.

Carl Friedlaender, however, showed that such atypical nests as he named them, are found also in other proceses, i. e., in syphilis, tuberculosis and lupus, that accordingly the evidence of such nests does not permit us to diagnose cancer. With the pleasure often noticed in him of tearing to pieces firmly established doctrines, he declares that the definition of cancer on pure anatomic grounds is not possible and that in addition, the clinical history must be considered in the question of malignancy. Anatomically this malignancy is first observable in that in addition to the mother tissue of the cancer to which the subepithelial connective tissue also belongs, other tissues as muscles, cartilages, bones, etc., are attacked by the growth. It cannot be denied that pathologic epithelial tumors growing downward from the surface occur in other lesions as well as in cancer.

In the larynx, syphilis, tuberculosis and pachydermia especially come in question. Appearances such as Finder has given us in plate VI of the 8th Vol. of these Archives, in syphilis of the tonsils, are found also occasionally in the larynx in connection with the conditions just named. In polyps of the larynx also, as described by A. Alexander in his "Contributions to the study of benign growths of the vocal cord," in Vol. VIII of these Archives, page 258, epithelial cells are often found which reach far into the interior and grow together so that they can simulate independent epithelial islets in the connective tissue. Waldeyer describes in his thesis already several times referred to by me, found in the 55th Vol. of Virchow's Archives, page 107, a hazel sized tumor of the larynx which Voltolini sent to him and which showed altogether the external appearance of a polyp but the structure of a granular

carcinoma. Waldeyer regards the tumor to be a cancer which presented the unusual form of a polyp because there were found in the granulation tissue, in several places, entirely isolated islets of epithelial tissue, of the appearance of ordinary cancer bodies, and transitional forms could be traced in the far-reaching epithelial nests. According to the state of our present knowledge, I am in doubt whether we have to do in this case with a cancer or a simple polyp, and in spite of Waldeyer I am inclined to the latter view.

Plate XII, to which I will come later, gives an example of the existence of such a swelling in tuberculosis. I have myself several times declared that such atypical nests can only be called cancer if the structure of the normal layers of epithelium is no longer recognizable in characteristic sections and if no cells any longer lie in contact with the surrounding tissue by which we can recognize the form of the basal membrane in its long axis. For in this way the boundary between the connective tissue and the epithelium loses its sharpness and appears effaced. This deviation of basal cells from the normal condition is so much the more important as they represent the matrix of the epithelium. The grave disturbance of growth and nourishment of the epithelium is evident, when they disappear from their normal situation, and yet the epithelium continues to grow. In carcinoma the stimulus for the new growth of epithelium proceeds from the surface and downward, and this change finds anatomic expression in the atypical condition of the basal cells. But the cells which lie between the basal cells and the superficial epithelium, in order to complete the diagnosis of carcinoma, in my opinion, must be lacking in their normal structure, so that the entire nest can be described not only in form but also in the structure of the cells as atypical. Kuttner has disputed this statement of mine. The careful study of this subject which I have pursued has showed me that Kuttner is right to the extent that it can happen that an atypical arrangement of cells can be formed in epithelial growths also which occur from other processes. This however is a rare occurrence, and I am still convinced that as a rule such nests, atypical in the arrangement of their cells, belong to cancer. I say intentionally "as a rule" because exceptions

occur. In spite of this fact, however, the atypical arrangement of the structure of epithelium, with this limitation will always be regarded as of value for the diagnosis. Virchow and his pupils, as regards the anatomical diagnosis of cancer, hold fast even to-day to the theory that each new growth only shall be described as cancer which in its base shows alveoli formation with heterotopic epithelium. As regards this, however, there are several circumstances to be taken into consideration. In the first place Hansemann has shown that cancer produces death without advancing into the deeper parts.

The practical necessity of being able to diagnose cancer in the small pieces removed from the larynx carries with it the fact that we do not find in many cases the first metastasis which such epithelial islets represent, and also cannot expect to. Since we must strive to recognize the cancer at the earliest possible time, the best time for treatment would be needlessly consumed if we must always wait for proof of "alveoli." Finally Ribbert asserts that these alveoli are always connected with the surface even if by fine processes only. That we must be on our guard against taking diagonally cut daughter nests for epithelial islets, is well known. We can accordingly not always demand the demonstration of free epithelial islets for the diagnosis of cancer and must be as cautious in the valuation of them for diagnosis as with atypical nests.

Yet I would emphasize in order not to be misunderstood, that I hold positive proof of alveoli as the significant sign of cancer. Recently Hansemann has asserted in his book, the second edition of which has just appeared, "The microscopic diagnosis of malignant growths (Berlin, 1902)," that that which is named by him anaplasia of the cells can be regarded of value in the diagnosis of cancer. The anaplasia is found in such cells, according to Hansemann, as have lost their different testing properties and have taken on individual development. This is accordingly a biologic designation. The malignancy is transferred into the cellular tissue. What we call malignant in the tumor, Hansemann calls anaplastic in the cells. This is certainly a valuable term. Its practical meaning however would first come into question when we

succeed in discovering the morphologic signs for the anaplasia in the cells. Hansemann, although with considerable reserve, advances the value of mitoses in this relation. He says, page 96, that he has found asymmetrical mitoses always in carcinoma, at times in sarcoma, never any where else. Nevertheless he would not upon such condition alone be willing to make the diagnosis of cancer. On the other hand, he says again that certain changed characters of the mitoses are found alone in the malignant growths and in no other regenerative or hyperplastic growth. If these observations of Hansemann's are confirmed, the abandoned heterology of the cancer element would again be called into discussion.

Cells which in their mode of development vary from all others which we observe in the normal organism represent something foreign to the body, accordingly something heterologous. In order to clearly see mitoses we must harden the tissue while yet blood warm and preferably in sublimate solution. This presents no difficulty for the section removed from the larynx for examination purposes. We can throw the pieces removed by the forceps conveniently into a sublimate solution. I have not succeeded however in being able to recognize in the character of the mitoses extensive differences compared with other processes in the larynx. Where we find numerous cells with mitoses we can always expect active tissue growth. This I have not been able to discover in cancer of the larynx. I can however console myself for my inability in the determination of the anaplastic mitoses, in that skilled pathologists, such as Ribbert for example, could not succeed any better than I.

There are still several other points which come into consideration in the diagnosis of cancer. I will here mention, in the first place, infiltration of the connective tissue. Waldeyer distinguishes between an introductory and an accompanying connective tissue development. Apart from the fact that carcinoma, like foreign bodies, gives a collateral irritation to the surrounding tissue, infiltration of the connective tissue in cancer of the external parts is an expression of disturbed good understanding which exists otherwise between the connective tissue and the protecting epithelium. There are found, however, around the acini of the cancer tissue, diseased

glands but they must be regarded with great caution for diagnosis, inasmuch as they are lacking in many cancers and occur in other conditions. The theories of Klebs regarding the condition of the blood-vessels in their significance to the diagnosis of cancer have already been criticised by Kuttner at length. On the other hand it is unmistakable that the presence of the so-called pearls and conglomerate giant cells in the larynx is of value. In the other organs less is to be concluded from the presence of this picture than in the larynx, where the presence of pearls and such conglomerate cells is described by different authorities as a sign which makes the diagnosis of cancer probable. Nevertheless pearls occur in the larynx also without carcinoma. At the International Congress at Paris I mentioned for example in my paper regarding the diagnosis of cancer, a case in which, in recurring papilloma of the vocal cord in an old man, we found pearls at a circumscribed spot. With the exception of this one place, the piece which was removed was certainly a papilloma. The tumor has not returned since the last operation in 1900 and the patient is entirely well.

In plate XII, I give as a further example the drawing of a preparation which is of interest in this particular. It is that of a patient in the middle of his fortieth year who shows on the ventricular fold, tumor-like thickenings. These were regarded for other reasons as cancer. The history of the patient was that he was a hard drinker and had constitutionalsyphilis and that he also coughed up blood. The examination of the lungs gave suspicions of tuberculosis. We had accordingly in the history of the patient an unusually large choice as regards etiology. In the pieces of tumor which I removed with the cutting forceps were found the conditions which I reproduced in plate XII. A large pearl lay in an epithelial nest which shows cells still basal and provided with a long axis though much disturbed in their regular arrangement. In other portions of the preparations, however, tubercular miliary nodules were found in the connective tissue, so without question tuberculosis existed. Later tubercular cells were found in the expectoration. The patient went into an institution for cure of diseases of the lungs after an antisyphilitic course of treatment had been

carried out. The tuberculosis however was not checked and two years later he died of consumption aggravated by albuminuria. In the larynx no further appearances of the tumor had shown themselves so we can confidently say it was not a case of carcinoma. The patient died some distance from here and I only recently heard of his disease. The autopsy, as much as I wished it, was not obtained.

With the exception of keratosis and pearl formation, other signs of retrograde metamorphosis of cells such as fatty degeneration, hyaline softening and so forth, in beginning cases, which are for the most part treated by us, have come less into consideration in the diagnosis. If we now group together these several observations which pathologic anatomy offers us for the diagnosis of cancer, we can say with emphasis that there is nothing pathognomonic by the recognition of which we can with certainty say that cancer exists. Carcinoma shows nothing which compares with the diagnostic value of the miliary nodules with their giant and epitheloid cells in tuberculosis. Waldeyer says rightly that we must assert without exaggeration that until we possess a sure anatomic diagnosis we will never establish the clinical diagnosis as it ought to be. It is therefore scarcely surprising if the same author in another place in this connection advances the following: "the idea of being able to make a prognosis from the anatomic examination alone, regarding the benignancy or malignancy of a growth must be given up; the malignancy of a tumor depends not alone on the anatomic structure, but upon very many conditions which arise partly from the locality of its development, partly from the condition of the patient. The same tumor which according to anatomic classification is regarded by one authority as altogether benign may by another be regarded as most malignant." Similar to these statements of Waldeyer, are those of many other authorities, and in the laryngeal literature there are many opinions of well known specialists in which the anatomic examination for the diagnosis of the tumor is regarded as worthless.

Under these circumstances it is not more than natural that many of us are looking toward *the promised land*, to the results which etiology gives us hope will be accomplished. The

certainly which we have obtained in the diagnosis of tuberculosis and other bacterial infectious diseases gives new encouragement to the wish to obtain similar results also in the diagnosis of cancer. Many circumstances make it probable that cancer also owes its origin to an infection. As debatable as this question still is, I am inclined to agree with those who would ascribe the origin of carcinoma to a *contagium vivum*. In tuberculosis before the discovery of its infectious nature, that which clinical and pathologic anatomy recognized in it as infectious was ascribed to a caseous collection of older date. The infectious material was said to develop in the body itself and spread through from some focus outward.

Now we know that the caseous center consists already of tubercular bacilli, and that the low condition of the system advancing from outside into the organism produces tuberculosis.

In cases of cancer, communications are multiplying in which the disease is reported in certain houses. It is also not to be denied that inoculation experiments from animal to animal, have turned out positively although they offer still much perplexity. Thus in the inoculation of *carcinoma keratodes* there occurs a pavement epithelial cancer. A carcinomatous peritonitis also resembles a tubercular peritonitis to a surprising degree. In my opinion, however, the deciding point is that the observation of a case of cancer forces the suspicion directly upon us that a *contagium vivum* lies at the foundation of cancer. At some place in the body there arise small epithelial swellings which in time cause a complete revolution in the character of the epithelium. These cells thrown as regards their nourishment upon neighboring parts destroy all tissues which they can reach. They form metastases whether in the form of epithelial islets or in other organs. Those authorities which deny the infectious nature of cancer assume that the metastases are brought about through the lymph stream or through peculiar movements of emigrant epithelial cells of the tumor. It is therefore a case of transplantation not of infection. But these epithelial cells carry, everywhere they come, the capability of destroying in the same manner as the cells of the original

tumor, all the neighboring parts and show a growth almost without limit.

I am at a loss to understand this peculiarity of cancer cells except on the theory that they possess some sort of fermentation. If this conclusion is correct we are forced according to the present standpoint of our knowledge necessarily to the acceptance of a *contagium vivum* which calls forth the cancer and renders possible its further extent in the body. But unfortunately it has been up to the present time a subject of conjecture alone. For in spite of all the labor and research science at the present time has not yet succeeded in demonstrating this *contagium vivum*. In very many places, poor investigating mortals have busied themselves with this and they are not the least talented and experienced who with all the help of our art are striving to solve this puzzling question. The announcement that the contagium of cancer is found, comes and goes like its predecessors only to sink after a short time into the historical lumber room or into the rubbish heap of oblivion. One fact presents itself now clearly, namely, that with the present methods known to bacteriology the *contagium vivum* of cancer cannot be discovered. For the moment, accordingly, the ameba also come into the foreground. In cancer there are cells, as Waldeyer first demonstrated which show, in a proper preparation under the microscope, individual movements. Dr. Feinberg declares that the ameba, which Leyden has described, is no ameba at all but a well known wandering cell. Feinberg describes another form which he found in carcinoma. We can devote no more time to his communications than to merely mention them. Perhaps they also belong to the cell inclosures which already have been taken erroneously for microbes.

At the session of the Cancer Committee, on the 22 of March, E. von Leyden demonstrated birds-eye like growths which are found in cancer cells and which he holds as the probable cause of cancer. Dr. Feinberg showed me his slides on March 25, and as far as I was able to perceive, his bodies are identical with those Leyden has demonstrated to us. The proper practical value of this exciting agent of carcinoma can be first determined when we possess it outside the body. COLOR also which up to the present time has of-

ferred so many veils by which nature has closed her secrets to our eyes, seems to be denied in the case of cancer. Pianese has occupied himself most actively with this question. His colored drawings, which at first glance seem like a March dream, represent wonderful and at first glance strange cell formations, but Pianese shows with the aid of accompanying drawings, that all these remarkable appearances have to do with changes in the cells and their nuclei and not with the ameba.

But the practical need of our science pressingly demands ability to make an early diagnosis whether cancer exists or not.

The possibility of saving the patient's life stands in direct proportion to the rapidity of the diagnosis. The clinical picture in many cases unfortunately leaves us no doubt whether cancer or some other cause lies at the bottom of the observed swelling. In two diseases indeed we are able to make positive diagnosis by clinical examination. One, when it is a case of tuberculosis and the other when it is a case of syphilis. In tuberculosis we can, when other methods fail, obtain positive results with great certainty by means of the tuberculin injection test. In syphilis we may draw conclusions from the remedies employed yet with some degree of reserve, for it is known carcinoma also can for a length of time improve under the use of iodides.

But there remains, even if one has time to employ these diagnostic remedies, always a group of tumor-like lesions in which the clinical picture gives no aid in making the diagnosis at the proper time. In not an inconsiderable number of growths in the larynx the laryngoscopic picture for example does not make it possible for us to safely decide between papilloma and pachydermic processes on the one hand and carcinoma on the other. Here I will call attention to the instructive examples which Chiari has collected in the eighth volume of these Archives. In such cases we can only make the diagnosis certain by the microscopic examination of the portions removed. This method of examination has been much used in cases in which syphilis or tuberculosis exists, but in which from the visible appearances, we do not at once recognize these diseases. It is also not to be mistaken that this offers us much more quickly than all others a

certain basis for our therapeutic measures. But ought we to draw conclusions or not from the microscopic examination of the pieces removed? I have had here a very large personal experience and can give assurance that those cases in which we can draw positive conclusions out of pieces removed represent by far the great majority. In many cases a clear picture of carcinoma is seen even in the small pieces. The second case reported by me above, is an instance of this. I could add many others and have published such in my early writings.

In other cases we see the characteristic picture of miliary tubercle nodules, i. e., giant cells in the neighborhood of epitheloid cells. Then we know it is a case of tuberculosis. Again in others the picture of pachydermia or papilloma is presented. But there remains a series of cases which give us pictures from which no positive conclusion can be drawn and where we must remain in doubt whether we have to do here with inflammatory processes alone, syphilis, carcinoma, or tuberculosis; conditions of which the microscope gives us suggestions without offering positive proof. Before I proceed to discuss the subject of the microscopic picture which leads us to positive conclusions, I would like to advance the assertion as regards our therapeutic measures, that the endolaryngeal method offers in all doubtful cases the unconditional advantage. In such cases we can, in fact with calm conscience and without any hesitation, employ the endolaryngeal method since carcinoma if present will show its presence beyond question on further examination.

I am convinced that the following circumstances point to cancer: In the first place epithelial nests which reach deeply in different directions into the connective tissue and which present an irregular structure especially the lack of basal cells and an obliterated boundary toward the connective tissue. If there are in these nests in the larynx also giant cell-like conglomerate cells and pearl bodies the diagnosis can be made with a probability bordering upon certainty. It is strengthened by the presence of atypical epithelial islets (alveoli) in the connective tissue which are not connected with the surface. As regards the significance of asymmetrical mitoses and specific microbes, the future must determine. A preparation

which includes not merely epithelium but also encircling connective tissue is always essential for the diagnosis of cancer. We must not content ourselves with the removal of the superficial structure merely. In papilloma there is a moderate thickening of the epithelium which grows outward and which is separated from the connective tissue by well defined basal cells and a sharp boundary. The connective tissue sends papilli, i. e., vascular loops into these epithelial masses. Most difficult is the positive diagnosis in many cases of pachydermia when there exists nest formation below the surface. Here the structure of the epithelial cells and the boundary between them and the connective tissue must serve as a guide in our decision. But we must not omit to mention that the picture of carcinoma as a whole presents something in itself right characteristic; we see at the first glance what an organism is on one hand and a machine on the other. If we desire however to define this difference we are immediately in difficulty. It is just the same as regards cancer. An experienced observer can in many cases say with certainty from the general appearance that this is carcinoma, though it might be perhaps hard for him to demonstrate this to another person who is in doubt. The carcinoma of the larynx with its pearls, etc., is most easy of recognition at the first glance. The unusual gland carcinoma presents also a typical picture. Difficulties however arise if it is a case of simple so-called medullary carcinoma.

When we turn after these remarks again to our previously reported cases there can in the second case, in my opinion, be no doubt that a carcinoma was present in the extirpated vocal cord. The evidence of this is contained in the description of the preparation. Difficulties first begin when we attempt to establish the limits of the carcinoma. Is the epithelial nest in plate V which suddenly developed, carcinoma or pachydermia? Is the great nest in plate X cancer or only pachydermia? Sections from the left vocal cord of the second case give excellent examples of the fact that epithelial nests which are many shaped do occur in pachydermia and extend to a considerable depth. With the permission of my colleague, Von Hansemann, I removed a piece from the free portion of the left vocal cord which Dr. A. Alexander again

kindly cut into serial sections. In the examination of these slides we must remember that they were removed from the cadaver, and from a larynx lying for a long time in Kayserling solution which had been reproduced in a drawing before this particular piece of the vocal cord could be removed. The vocal cord itself had been observed laryngoscopically for a year by me and I had never seen anything else in it but a pachydermia diffusa. Further, nothing had been noticed in the cadaver itself as the section protokol shows, which in the least could have excited the suspicion that a malignant neoplasm was present in it. We can on this account affirm more positively than is generally the case in cadaver preparations that there was present here only a pachydermia and yet the so-called atypical nests reaching into the depth and partly branching, are seen in the preparation. Figure 4 gives the fifth section of the fourth slide. The fissure which is seen in the lower portion is found in all the sections of the entire series. All the nests however are separated from the connective tissue by a sharp line and show here well formed basal cells. We can perhaps note striking changes in the form of the cells, i. e., large cells with vacuolar formation. The upper layers of the epithelium are deeper stained, and certainly not alone due to their presence in the Kayserling solution. In places the epithelium is entirely lacking and where, as is shown in the drawing, the surface is covered by thick masses of epithelium, the upper layers give the impression as if something were lacking there. The nests which press from the layers of the thickened superficial epithelium into the depths are distinguished from the latter not merely as regards their color. In this particular we may observe the upper portion of the drawing. Here the nests give the impression as if they were younger than the upper layers. It appears here also in many places as if the basal cells of the upper layers were pushing papilla-like into the nests. The particularly characteristic infiltration of the connective tissue is no where present. Marked difference in the large variously shaped nests of the right side are not discoverable.

Finally if we come to the anterior portion of the right vocal cord there can be no doubt that it is not a case of cancer but only one of pachydermia. But transitions from these

appearances to the actual carcinoma give excellent examples of the difficulty of the diagnosis. I have no doubt that many would extend the boundary of the carcinoma further than I have placed it. I have placed the limit of the carcinoma where a regular structure of the epithelium is present in the atypical nests especially of the basal cells near the connective tissue. Others will regard the nests which I have already called pachydermia, which are pressing into the depths found in the neighborhood of the cancer, as cancer, perhaps on account of their nearness to it. Until mitoses, microbes of allied structures have been freed from all question of doubt, the estimation of such pictures will depend upon the discretion and experience of the individual observer. If the diagnosis is to be followed by a surgical therapeutics, we ought as little as possible to be content with merely grounds of suspicion. We must rather complete the objective proof beyond a question of doubt. We have accordingly in the two cases, reported examples of the phenomenon which has already often times been observed and reported in the literature, that cancer may develop on the soil of pachydermia. He who wishes to set in motion the music of the future can occupy himself with presenting theories regarding the etiologic connection of the two conditions. Both the cases reported have certainly great interest pathologically and they are also worthy of note, in that, in both cases the cancer of the larynx was altogether healed. In case two this is demonstrated in the cadaver. The first case is still alive four and a half years after the removal of the cancer and is entirely well.

IV.

LARYNGEAL PARALYSIS AS A PRIMARY SYMPTOM OF TABES DORSALIS; WITH REPORT OF CASES.

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Tabes dorsalis, as defined by Prichard, is "An organic disease of the periphereo-central sensory nervous system characterized symptomatically by incoordination, sensory and trophic disturbances, affections of special nerves, the optic and ocular particularly, and involvement of the sphincters."

This dual cause of the classical symptoms of locomotor ataxia, periphereo-central nerve degeneration, likewise explains the occurrence of the manifold and not uncommon paralytic and spastic affections of the larynx.

Until recent years incipient tabes as a causative factor of otherwise unexplained interference in laryngeal innervation remained entirely unrecognized, while its true status is even now rarely appreciated. On the other hand, paralysis as a complication of advanced spinal sclerosis has been so well studied and described that the possibility of its occurrence is universally recognized.

In one hundred cases where the general condition was well advanced, Semon found fourteen with some form of laryngeal paralysis, and of 122 cases examined by Gerhardt, seventeen were so affected.

Grouped according to the lesions discovered, we find:

Unilateral posticus paralysis.....	14	cases.
Bilateral " " 	8	"
Unilateral recurrent " 	5	"
Bilateral " " 	1	"

In the three remaining cases, complicated conditions not permitting of exact classification were found.

Semon has recently reported an additional case of bilateral recurrent disease, making two in all.

Thus in 222 consecutive cases we have 31, or 14 per cent. with complete or partial paralysis of the motor nerves of the larynx, and yet this percentage, large as it is, does not correctly portray the frequency of laryngeal complications, for aside from these cases of paralyzes, instances of disturbed sensibility, spasm and crises are not rare.

The failure to appreciate the frequency with which these conditions occur is due to the fact that the lesion most commonly produced, unilateral posticus paralysis, causes no subjective symptoms. The voice is unimpaired and the respiration unaffected except upon unusual physical exertion. Owing to the general condition this effort is seldom made and hence the lesion may exist for years unsuspected.

The lesions which cause aphonia and dyspnea are rare and as laryngeal examinations have not been systematically made in tabetic subjects, except where there is subjective evidence of laryngeal abnormalities, the true percentages have never been definitely ascertained. Moreover, all published reports deal simply with paralysis occurring in those with advanced or at least recognizable spinal lesions, whereas, the true clinical importance of the subject has little connection with this class, for here we are confronted with a well developed disease, incurable and easily diagnosticated, with a laryngeal complication that adds, as a rule, but little to the general suffering.

As a premonitory symptom of the general affection, however, these local changes are of the utmost importance, as they occasionally permit the making of a diagnosis that would otherwise be impossible.

It is this phase of the question that has suffered almost total neglect, and it is surprising that in no American or English text-book with which I am acquainted is this pre-ataxic paralysis described. In 1896 Hajek of Vienna called my attention to such a case and spoke at length upon its occurrence, and yet it has never been considered except by a few German investigators.

The known frequency with which these paralyzes, antedating all other symptoms, have been observed and their innocuous nature which does not lead the patient to seek medical advice, make me believe that they are symptoms of rather

common occurrence. As their existence can be discovered by chance only, many a case of ataxia may have had this sign without its being recognized. In none of the published cases nor in mine, where a paralysis was found complicating advanced tabes, was it known or discoverable how long the condition had existed, and it is a fair assumption, in view of the known cases in which it has preceded all other manifestations, that in some of them it may have been the first instead of one of the late symptoms.

A paralysis of abduction, unilateral or bilateral, for which a causative factor cannot be discovered, should always arouse a suspicion of locomotor ataxia; if all other symptoms are wanting the patient should be kept under close observation and examined from month to month, and in many instances after a considerable lapse of time, from six to twenty-four or even thirty-six months, a diminished reflex, an Argyll-Robertson pupil or some other manifestation will develop and disclose the true factor.

The pathologic reason for the development of these paralyzes so far in advance of all other changes is not definitely known.

In a large majority of the cases studied post-mortem the lesion found was a degeneration of the peripheral nerves. This has affected either the recurrent alone or the trunk of the vagus. In many the medulla has been involved but the nuclei were generally free. The same pathologic changes would undoubtedly be found in the pre-ataxic form. It is well known that the first alteration, either as a degeneration or a neuritis, is sometimes found in the oculo-motor or optic nerves, and the same may well be true of the vagus or recurrent.

Unilateral posticus paralysis has been rightly termed "the tabetic larynx par excellence," for in a large percentage of the cases, both where the lesion occurred as an early and a late manifestation, loss of power in the posticus was first observed. This condition runs its course symptomless and commonly persists, unchanged, for years or even throughout the entire course of the disease.

Bilateral posticus paralysis, the form next in frequency, occasions but slight alteration in the voice, and dyspnea is

always produced. Recurrent disease, unilateral or bilateral, has never been seen as a primary lesion.

There occasionally occurs a transitory (functional) paralysis of the adductors, but the first lesion is almost invariably one of abduction. In all organic paralysis the posticus is the first muscle to suffer, probably because of greater vulnerability, although the true pathogenesis is unknown. By the time other muscles are involved, in the disease under consideration, the general symptoms are well advanced and thus it is that we see but this one form as a pre-ataxic condition. It might be possible for the degeneration to have advanced to such a degree that complete recurrent paralysis had developed before other organs or muscles were involved, but such cases have not been observed and I doubt the probability. Posticus paralysis usually remains stationary a long time while the spinal sclerosis steadily advances. In addition to paralysis we occasionally see instances of laryngeal crises, either independent of paralysis or in connection with it. Either of these forms, the uncomplicated crisis or the crisis in connection with a previously developed paralysis, may develop as the primary symptom, although they usually belong to a later stage of the disease.

The crisis is distinguished by a peculiar sensation or irritation accompanied by severe attacks of coughing, and occasionally by dangerous suffocative seizures. To these symptoms there is added an almost characteristic crowing inspiration like that of laryngismus stridulus.

Ataxia of the cords and increased or diminished sensibility may likewise accompany the general process. These conditions have been minutely described, however, and are not within the purport of the present paper, never having been observed in advance of other symptoms.

The points to which I have desired particularly to attract attention are the following:

1. Laryngeal paralysis, as a complication of tabes, is present in about 15 per cent. of all cases.
2. Paralysis may precede all other symptoms by from six months to three years.
3. This primary paralysis is always limited to the posticus muscle and is usually, if not invariably, unilateral.

4. The process usually remains limited to this muscle for years or during the life of the individual.

5. This primary paralysis is fairly common; the true percentage will never be ascertained owing to the long absence of subjective symptoms.

6. When the cause of an abductor paralysis cannot be accurately ascertained, locomotor ataxia must be considered.

7. That it is frequently of great diagnostic importance, in that it will draw attention to the general condition and thus sometimes uncover an unsuspected ataxia.

8. In all cases where the diagnosis of tabes is doubtful, a laryngeal examination should be made whether or not there be subjective laryngeal symptoms.

Cases.

1. Unilateral posticus paralysis antedating other symptoms by at least fifteen months:

Male, aged 46. Previous health good. No history of syphilis or alcoholism. In April, 1897, he consulted me on account of obstructed nasal breathing, due to a large nasopharyngeal mucous polyp. Laryngeal examination revealed a paralysis of the left posticus muscle. How long this had existed it is impossible to state. Nothing in his past history or present condition gave any clue to the causative factor. Kali iodid, strychnine and intra-laryngeal galvanism produced no effect, and after two months the patient discontinued treatment.

In September, '98, fifteen months after the first examination, he returned and a diagnosis of ataxia was made. For the past six weeks there had been lancinating pains in the lower limbs and examination showed diminished but not abolished patellar reflexes, Argyll-Robertson pupils and impaired tactile perception over the plantar surfaces of the feet. Romberg's symptom and other signs of ataxia were absent. The laryngeal picture was unaltered.

2. Paralysis antedating general symptoms by seven months.

Male, aged 39. Syphilis seven years ago. Had continuous treatment for over two years without subsequent symptoms.

Past history is otherwise negative. Married and has three healthy children.

In December, 1898, in the course of a general examination of the nose and throat, I found a paralysis of the left posticus muscle. Syphilis was the only etiologic factor in evidence. Treatment for seven weeks made no impression. In the latter part of June, '99, seven months after the discovery of paralysis, the laryngeal condition had not changed but Romberg's symptom was present, there were slight vesical and rectal irritation, diminished reflexes and pin-point pupils. How soon these symptoms had developed after cessation of treatment I do not know, but I had seen him on the seventeenth of April, four months after his first visit, and at that time they had not become manifest. In January, 1900, I saw him for the last time and all the tabetic symptoms were increased, but the paralysis was still limited to the posticus.

3. Right posticus paralysis antedating other symptoms by twenty-two months.

J. B., colored, aged 37. Laborer. Had chancre fourteen years ago. Previous to treatment for an inflamed pharyngeal bursa, a laryngeal examination was made with discovery of the paralysis; as in the other cases, nothing could be learned of the probable date of development. Repeated examinations failed to uncover any cause other than possible pressure due to enlarged glands. Specific treatment failed to produce any improvement. Twenty-two months from date of first visit he reappeared—six examinations in the interim proving negative—with a history of gradually failing eyesight. The laryngeal paralysis had not advanced but examination of the eyes showed beginning optic atrophy. Several months later other symptoms developed and the picture became typical. A short time after this I came west and lost sight of the patient.

I have then a personal record of three cases of undoubted pre-ataxic paralysis, which, with the case seen in the clinic of Hajek, makes four in all in an experience of a little less than seven years. In addition I have one other case to report where the diagnosis is still in doubt but which I expect to become ataxic.

This record is all the more remarkable from the fact that I

have not had an opportunity of examining or seeing any cases of incipient tabes aside from those that came to me for some throat lesion.

4. Male, aged 52. Russian. No specific history; the patient spoke but imperfect German and hence no accurate history could be obtained. Three weeks before he first consulted me there had been an attack of acute laryngitis. Under treatment the voice soon gained its normal pitch and clearness with a partial return of the hoarseness two weeks later. When I first saw him, both cords were slightly congested and the left cord would not abduct. In three days the hyperemia had completely disappeared and the larynx was apparently normal except for the paralyzed cord. No local cause for the impaired motion was discovered.

A general examination revealed an Argyll-Robertson pupil and a double aortic lesion. Under general treatment the general condition improved and in a few weeks he was apparently well except for the cardiac lesion that had ceased to bother him.

The affected cord had regained at least one-half its normal motility, but at that point remained stationary.

I am confident that if this case can be kept under observation, the presence of tabes can sooner or later be proven, for a posticus paralysis with an Argyll-Robertson pupil is almost definitely diagnostic. We have here, however, two confusing factors; the double aortic lesion and the improvement upon the affected side.

With the lesions of the valve there might be a slight dilatation of the aortic arch sufficient to cause pressure but not large enough to be demonstrable.

That a diminution of such a dilatation, if existent, sufficient to partially relieve the pressure symptoms, could occur within a few weeks without the patient being at absolute rest, I do not believe.

The partial return of function in the paralyzed nerve may invalidate the claim of tabetic degeneration or neuritis, but in the ocular and optic nerves we have many parallel cases. Paresis of the ocular nerves in locomotor ataxia is frequently transient, reappearing later as a permanent condition; in the course of optic atrophy remissions may occur and the Argyll-

Robertson pupil may occasionally completely disappear and remain absent during the further progress of the disease.

It may be that in this case we have an instance of transient improvement. There are no recorded cases of a like nature but in view of the parallel conditions of the optic and oculo-motor nerves, there is reason for believing that such is the case.

I realize that the history of this patient can be of no definite value without further observation; it is recorded merely to show the frequent difficulties of diagnosis and the importance of considering the possibility of an incipient tabes existing, even when there are almost no general symptoms to support the supposition.

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V.

THE TREATMENT OF RECURRENT MASTOIDITIS.

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The complete mastoid operation as ordinarily performed, is sufficient in all cases to relieve the patient from the immediate danger of suppuration within the pneumatic spaces of the temporal bone and is usually, in the great majority of instances, followed by the complete relief of all symptoms.

Looking over the notes of a large number of cases operated upon. I find that in very few instances have there been any recurrent attacks of mastoiditis. In almost every instance, the operation wound has healed perfectly in the course of a few weeks or months. In a very small proportion of cases which have come under my observation, both at my clinic and in private practice, the operation has not been followed by a complete cure. By this I mean, that occasionally a small sinus has remained behind the ear, and the probe introduced into this has been able to detect exposed bone at the bottom of the sinus. I am fully aware of the fact that in a certain small proportion of cases complete healing of the wound takes place only at the end of several months. This delayed healing does not, in any way, indicate that the operation was incomplete or that it was imperfectly performed. Such delayed healing usually depends upon an impairment in the general health of the patient, as the result of which reparative processes are much delayed. The mere presence of a small area of exposed bone at the bottom of a sinus, following the mastoid operation, does not

call for immediate operative interference, provided the wound appears healthy, and the patient has no symptoms which can be logically referred to this local condition. Patient and careful treatment will probably bring about a complete closure of these sinuses, even after they have existed for one or two months. In a certain class of cases, however, we find that a sinus will persist for from six to twelve months after operation, and that the probe will reveal not only exposed bone but softened bone at the bottom of a long narrow fistula; the walls of such a fistula, and usually its orifice, will be covered by unhealthy, exuberant granulation tissue; in fact, we are certain both from tactile examination and ocular inspection that there is carious bone at the bottom of the sinus.

In another class of cases, the mastoid operation is apparently followed by complete cure. The wound heals sometimes rapidly, sometimes slowly, but eventually closes completely and the patient seems to be in perfect condition. At some period, varying from a few months to one or two years perhaps, the patient will complain of pain in the ear, and this pain will be followed by pain in the mastoid, mastoid tenderness, and finally, by the development of a post-aural tumor occupying the cicatrix of the old mastoid wound. This post-aural tumefaction comes on quite rapidly in young subjects, and not infrequently is the first sign noticed by the parents. The child may complain of but little or no discomfort about the ear, may seem only slightly indisposed and fretful and quite frequently the first symptom referable to the ear will be the development of the post-aural tumor.

During the past few months I have operated upon nine cases in which a previous mastoid operation has been performed and in which either a sinus has persisted for several months or in which the patients have returned with a recurrent inflammation of the mastoid structures. In all of the cases of which I am now speaking, a second operation has been performed. The exposure of the parts has invariably revealed the presence of dead bone in the tympanic vault, In a number of cases, the ossicles themselves have been carious, but sometimes the ossicles have been practically normal, the caries being limited to the walls of the tympanic vault.

One of these cases had been previously operated upon by myself. The other patients were referred to me from other sources. It has been my practice in these cases to perform a radical operation in every instance. By this I mean the ordinary Stacke-Schwartz operation, the middle ear, mastoid cells and external auditory canal being converted into one large cavity. In all of these cases I have subsequently lined the operative cavity with Thiersch grafts taken from the leg. The results in all cases but one have been entirely satisfactory. In one case a fatal termination took place from intracranial infection, this condition undoubtedly being present before the operation was performed.

Looking over the histories of these cases, I have found that in a large number of instances the patients had been suffering from a chronic purulent otitis, of long duration, before the first operation upon the mastoid was performed. In other words, the primary acute mastoiditis was due to a preceding chronic suppurative otitis media, and did not follow an acute inflammatory process in a previously healthy ear.

I have been led to bring this subject before this Section for the reason that I believe this series of cases should teach us that whenever we have to deal with an acute mastoiditis, in a patient in which the affected ear has already been the seat of a chronic purulent inflammation, we should not be content with relieving the immediate acute symptoms by doing a simple mastoid operation, no matter how thoroughly this is done, but I believe the procedure indicated is one which will not only relieve the suppuration within the mastoid, but will at the same time cure the suppurative otitis as well, and will protect the patient from the possibility of any further trouble in this direction. It is now my practice whenever a case of acute mastoiditis presents itself at my clinic, to go over the case carefully, and to find out whether the patient has ever had an aural discharge previous to the present acute attack for which he presents himself for treatment. If I find that there has been from time to time a discharge from the ear, I immediately do a radical operation, instead of the simple mastoid operation. By the simple mastoid operation, I, of course, mean an operation in which every vestige of the cellular structure of the mastoid is

broken down, and all of the pneumatic spaces obliterated. This includes the removal of the tip of the process, and also the destruction of zygomatic cells, if these are present, and the establishment of a free communication between the middle ear and the operation cavity. In cases of acute mastoiditis in which the ear has not been the seat of a chronic supuration, such an operation yields extremely satisfactory results. Recurrent mastoiditis, in these cases, is no more apt to occur than was the initial attack. In fact, although we have no figures upon which to base this conclusion, it is probably less liable to occur than in a previously healthy ear, as the firm cicatricial tissue, which supplies the place of the pneumatic spaces, offers an unfavorable nidus for the development of pathogenic organisms. If, however, this operation is performed in a case where intratympanic caries has previously existed, it will not infrequently be found insufficient to protect the patient from future attacks. Even if the wound heals perfectly, and it does in many of these cases—the patient is in danger of suffering at some future period from another attack of acute mastoiditis. It should, therefore, be the rule, I think, considering what we have learned from those recurrent cases operated upon to protect the patient from these possible subsequent attacks, by removing every vestige of carious bone from the tympanic cavity, and to obliterate that cavity so completely as to prevent its constituting any further menace to the patient. If this is done, attacks of recurrent mastoiditis will be very much less common.

The same rule then applies in operating upon a case for the first time. If there is any evidence of a previous purulent inflammation, the operator should not be content with doing the simple mastoid operation, but should at once proceed to perform the radical operation.

Whether or not the wound should be closed at the time of the primary operation must depend upon several circumstances. If there is a large post-aural abscess, the soft parts will frequently be in such a condition as to make it wise for the surgeon to simply make his flaps from the auricle and canal and suture these in position. The upper and lower angles of the incision may also be brought together with

silkworm-gut sutures. A gauze packing is then introduced through the posterior opening into the middle ear and allowed to remain there about three days. The case is then redressed, and is frequently found in a condition suitable for grafting at this time. Sometimes the grafting must be delayed until seven or eight days after the primary operation. When the grafting operation is done, the posterior wound is completely closed and the middle ear packed through the external auditory meatus. Where the post-aural abscess is not large, a good result may often be obtained by applying the grafts at the time of the primary operation and closing the posterior wound completely. In cases of acute mastoiditis following a chronic middle ear suppuration, in which no post-aural abscess is present, and in which it is decided to perform the radical operation at the time the patient comes under observation for the relief of the acute symptoms, it will ordinarily be possible to graft the bony cavity and close the posterior wound completely at the time of the operation. In some cases, however, there may be such extensive destruction of bone that the surgeon will prefer to wait, leaving the posterior wound open for a few days, doing the grafting operation and closure of the posterior wound at a period of from three to eight days after the primary operation.

In one case, operated upon a short time ago, there was very extensive bony destruction. The sinus was laid bare for a considerable distance. In this patient the wound was not in a condition to graft for about two weeks after the primary operation. During this time the posterior wound had narrowed considerably, and after inserting the grafts it was found impossible to bring the margins of the posterior incision together on account of the cicatricial contraction of the parts. The integument from the posterior surface of the auricle was therefore undermined and the adjacent skin over the mastoid, bordering the wound posteriorly, was treated in a similar manner. These sliding skin flaps were then brought together, thus closing the posterior wound completely. The patient made a perfect recovery.

The rule followed in this case, of allowing the parts to granulate for a considerable length of time, the posterior wound being left open, is probably the procedure which should

be followed in most instances where the dura is exposed over any considerable area, especially the dura covering the sinus. It seems hardly wise, especially in an acute case, where the sinus has been exposed and may later become thrombosed, to apply the grafts and close the posterior wound at the time of the primary operation. In cases of less extensive bony destruction, however, where the cranial cavity is not invaded, primary grafting and complete closure of the posterior wound should be the rule.

VI.

THE TREATMENT OF ABSCESS OF THE SEPTUM WITH SPECIAL REFERENCE TO THE PRE- VENTION OF SUBSEQUENT DEFORMITIES.*

By C. G. COAKLEY, M. D.

NEW YORK.

The treatment of an abscess of the septum may be considered under two heads: First, the evacuation of the pus for the relief of the immediate symptoms, such as pain and nasal obstruction. Second, the prevention of subsequent deformities. These vary considerably and depend upon the destruction of part or a whole of the cartilaginous septum, the development of new connective tissue between the two layers of muco-perichondrium over the site of the cartilaginous septum and the sinking in of the soft parts over the tip of the nose, owing to lack of proper support.

On looking up the literature of abscess of the septum, as contained in the text books, written by American and foreign authors, the reader will find much valuable advice as to treatment under the first heading. The importance of an early evacuation of the pus is stated, and many valuable suggestions are given regarding the subject of drainage to prevent reaccumulation of pus. No writer gives explicit directions, which if followed will prevent or minimize the subsequent deformities.

It is hardly necessary to remind the Fellows of this Society that the cartilage of the septum receives its nutrition from the mucous membrane on either side of it, and that therefore this portion of the nasal mucous membrane acts as a perichondrium to the cartilage. It has surprised us to note how quickly the cartilage melts away and disappears when pus

*Read before the Eastern Section of the American Laryngological, Rhinological and Otological Association at Boston, February 14th, 1903.

is formed on each side of the septum between it and the mucous membrane. In one case a male aged 27, who was first seen six days after a blow on the nose, a bilateral swelling was found just within the vestibule of the nose and after evacuating about two drachms of pus, a perforation of the cartilage of the septum 3-4 of an inch in diameter was detected. In dispensary practice it is not unusual for a patient to present himself with an abscess of the septum anywhere from one to three weeks following the traumatism, and if the abscess is bilateral, there is always a large loss of the cartilaginous septum. If such cases are treated similarly to abscesses in other parts of the body, namely, by incision, evacuation of the pus, washing the cavity with an antiseptic solution and drainage, deformity in some degree will result. Tamponing the anterior part of the nasal cavities opposite the cartilaginous septum as advocated by some authors, and as formerly practiced by the writer, was frequently followed by considerable deformity. On studying these cases we noticed that the septum was unusually thick over the site of the abscess, due to a separation of the two layers of muco-perichondrium. The intervening space was filled in with connective tissue. This broadening of the septum interfered with the respiratory functions of the nose in one or both nasal cavities, and in time a greater or less depression or flattening of the exterior of the nose took place. Believing that this thickening and depression was due to the uneven pressure of the gauze packing, it occurred to me to employ the Simpson tampon to keep the two layers of muco-perichondrium in close juxtaposition during healing and at the same time to help bear the weight of the superimposed soft parts until the newly formed connective tissue was of sufficient density to support them unaided.

An incision is made into the abscess cavity on that side which seems the more soft or fluctuating. The incision is begun opposite the middle of the calumna, and as far anterior as possible. It is carried with one sweep down to the floor of the nose. The abscess cavity is irrigated with carbolic solution, 1-100, the head being inclined forward so that the fluid will come out of the anterior nares and not flow through the nasal cavity. Both nasal cavities are then sprayed with a 4 per cent.

solution of cocain, to which a few drops of adrenalin chloride, 1-1000, have been added.

After waiting five minutes, a cotton-wound applicator is passed into each nasal cavity, back of the posterior border of the abscess cavity, and together they are drawn forward making pressure against the septum, thus stripping the abscess cavity of any remaining secretion. The nasal cavities are next irrigated with Dobell's solution and a Simpson's tampon inserted into each naris. In the case of children, and in some adults, it may be necessary to trim the tampon to fit the nasal cavity. The tampon inserted into the side on which the incision was made should have its anterior end just posterior to the line of incision into the abscess. If a little antiseptic spray be injected into each naris the tampon will immediately swell and the operator may be sure that they will retain their place. A small piece of gauze may be inserted into the abscess cavity for 24 to 48 hours, if desired, but we have found that if the incision were a good, generous one, say from 3-4 of an inch to 1 inch in length, gauze drainage is unnecessary. Tampons must be removed every 24 hours and fresh ones inserted for about a week. The nasal cavity is sprayed with cocain and adrenalin each time and also irrigated with an antiseptic solution. At the end of a week some form of hollow nasal splint may be substituted for the Simpson tampons, for while wearing the tampon the patient must necessarily be a mouth breather. The splint which we have most frequently employed is the non-perforated Kyle splint, on account of the ease with which it can be moulded to the peculiarities of each case. It is advisable to wear the splints for three weeks, at the end of which the connective tissue will be well organized, the septum of normal thickness, and having a rigidity that very closely approximates that of the normal cartilaginous septum.

VII.

THE REMOVAL OF THE STAPES FOR THE RELIEF OF AUDITORY VERTIGO.

BY EUGENE A. CROCKETT, M. D.

BOSTON, MASS.

In considering the etiology of auditory vertigo, it is evident that a lack of mobility of the base plate of the stapes or of the membrane of the round window must be a primary cause in many cases. Such lack of mobility may be from primary fixation of the stapes, or from the membrana tympani or ossicular chain being rigid, and thus preventing a free motion of the base plate in the oval window. In the second class of cases, it would seem that relief of the symptoms under consideration should be obtained by some one of the simpler middle ear operations such as removal of the membrane, malleus and incus (Kessel's or Sexton's method), or removal of the incus alone in the manner so enthusiastically advocated by Burnett. Certainly in some instances marked relief may be obtained by the simple cutting of the intratympanic adhesions or mobilization of the stapes. Where, however, the lesion is primarily about the stapes base plate, no operative measure short of the actual removal of the ossicle will be of any avail, and a consideration of the pathology of this form of ear disease will show us the impossibility of removal of the base plate in advanced cases, owing to the firm cartilaginous or osseous adhesions between the stapes and the edge of the fenestra ovalis.

A considerable experience in middle ear operations has led the writer to advise such a procedure only as a last resort, and the present operation is advocated only in the severe form of auditory vertigo, and then only when the ordinary treatment has proved futile.

A certain amount of information may be obtained from the consideration of the case history and appearances of each

individual case, and particularly on a careful hearing test. For instance, cases showing marked thickening of the membrane, marked retraction of the malleus with prominence of the posterior fold, or cases where on inspection adhesions can be seen in the tympanum, are more likely to get relief by a simple operation (such as Kessel's) or by the simple cutting of the intratympanic adhesions. Cases where the membrane is normal in appearance and the hearing test shows the trouble to be localized about the base plate of the stapes will, in my opinion, not be benefited by any kind of operation except the removal of the stapes and this will be particularly difficult as will be at once seen by a consideration of their pathology. Where, in such cases, a low tone deafness does not rise above middle C in the musical scale and where there is no high toned deafness or where the upper tone limit is not below 20,000 vibrations a second, the operation of stapedectomy may be undertaken with a fair chance of removing the entire ossicle. Where the upper tone limit is below 20,000 vibrations or the lower limit is above 512 vibrations, the chances are that the ankylosis of the ossicle is so complete that the attempt at its removal will be followed by rupture of the crura at their junction with the base plate and, of course, in such cases no benefit will result.

In such individuals as those whose histories are detailed later, any line of treatment which offers any hope of relief is justifiable provided the different possibilities are carefully explained to the patient in advance.

D.; 45 years old; first seen in March, 1894. Well developed man; conducting a large business and under a considerable mental strain; uses alcohol and tobacco moderately; has had gout severely in the past but not for about two years; has noticed an increasing deafness about two months; no tinnitus. Has recently been under a severe mental strain and has been very nervous with some insomnia. In the last month his hearing has grown rapidly worse in the right ear and he has had slight vertigo nearly every day. His urine has been recently examined and shows nothing abnormal beyond a high specific gravity and acidity from concentration. At the first examination both membrana tympani were found thickened and non-transparent and showed scars

from suppurative disease in childhood. His hearing was diminished for the watch and voice in both ears but especially in the right, but the upper and lower tone limits were not affected. The test showed no internal ear affection. On the day before the examination he had been seized, while sitting in his office, with an apoplectiform attack of vertigo and fell out of the chair on the floor. The nausea and vomiting in this attack lasted about two hours. Middle ear treatment with the Eustachian catheter and Politzer inflation was begun at this time and continued a year; tympanic massage with a Siegle speculum was also used for a time, as well as general tonic treatment. Acting under the impression that business strain might have something to do with the symptoms of vertigo, two long vacations were taken. The patient was also dieted, so that he was reduced 20 pounds in weight, and his general condition was undoubtedly much improved. Under this constant treatment his hearing improved slightly but he had over twenty attacks of vertigo, nausea and vomiting in a year, some of which were of the severe apoplectiform type. An examination of his eyes showed nothing abnormal beyond a slight hypermetropic astigmatism, correction of which made no improvement in his condition. In the fall of 1895, a middle ear operation was advised and under cocain anesthesia an incision was made in the posterior portion of the right membrane tympani and a hook passed between the crura of the stapes. This ossicle was found freely movable, and its removal was therefore deemed unadvisable. The incudo-stapedial articulation was cut and the incus removed with a snare. Instantly the patient exclaimed that he was deaf in the right ear, and an examination showed a total loss of aerial hearing in the ear for watch, voice and tuning forks. A sensation as if a band were drawn around the occipital region from ear to ear, which had existed since his first vertiginous attack, was gone and there was no vertigo for over six months, at the end of which time the attacks began again, so in the spring of 1896 the stapes was removed under ether anesthesia. The ossicle was apparently freely movable and came out with great ease. Following this last operation, the patient had a few slight attacks

of vertigo for about two months, since which time he has been perfectly free from any trouble of the kind.

May 17, 1901. G. W. S.; 41. Three years ago patient had an attack of vomiting lasting for about 15 minutes, preceded by an attack of vertigo, during which objects would seem to ascend. These attacks became frequent; intervals of one month to two or three weeks occurring between; each attack preceded by vertigo. Sometimes objects would descend and other objects "go round." Patient would feel badly for four or five days after. Vomiting would last four or five hours. At times when patient would whistle above certain notes he would hear double—a lower note than that whistled and in accord. This has not occurred within past two months. Also when hearing music which previously would appear natural, recently the higher notes would seem discordant. He has had some pain in the head before attacks also, otherwise seems well. Just before the operation, the patient's vertigo became practically continuous and the vomiting so severe as to render it impossible for him to continue with his business. Ordinary treatment of the middle ear had given no relief. Examination:—A. s. m. t. somewhat dull in lustre and retracted moderately. Canal normal.

May 18, operation, ether, half hour.

After application of adrenalin 1-5000, a triangular flap was removed from posterior segment of membrana tympani. Incudo-stapedial joint cut through and attempts made to remove incus. This was impossible as incus retracted upward and backward and out of sight. Stapes not visible on account of adhesions. Adhesions cut and hook passed between crura of stapes by feeling; bone was drawn down into view but as the stapedius tendon had not been cut, the stapes was pulled upward and backward into mastoid antrum; some perilymph escaped from the fenestra ovalis. Canal filled with sterile cotton and sealed with collodion. Recovery from ether slow and patient very much nauseated, the nausea lasting until midnight.

May 19th. Patient very dizzy unless he lies perfectly

quiet. No vomiting this A. M. Takes liquid nourishment in fair amount.

May 20th. Dizziness less marked but patient unable to sit up. Cotton in canal is soaked with serum and blood and renewed. No odor. Temperature normal.

Potassium bromide gr. x given t. i. d.

May 21st. Patient can sit up but sudden motion brings on dizziness.

May 24th. Slight serous discharge from tympanum. Ear wiped dry and powdered with boric acid. No pain in ear.

May 27th. Ear still has a very slight serous discharge. No dizziness.

May 31st. About one cotton stick saturated with discharge in 24 hours. Perforation in posterior segment with slightly edematous edges persists. No dizziness.

May 31st. Discharged improved.

Bezold forks show:

Hearing, Right ear Low D 1 = 36 d. v.

Right ear, High Normal.

Left ear, Low e² whistle.

Left ear, High Galton 5.4.

Bone conduction always referred to right ear.

Forks not heard by air conduction.

Whistle heard from e to 5.4 Galton.

Weber referred to right ear.

Three weeks after the operation the patient resumed work and until January, 1903, had absolutely no vertigo. In this month a slight dizziness was produced by an acute serous catarrh of the unaffected ear which disappeared after the catheterization of the Eustachian tube.

In addition to these two cases, I have operated on two others with similar case histories, in one of whom the lower tone limit was 2048 and the other 1024. In both of these cases, the vertigo was so severe that anything seemed justifiable. In both, the incus was removed with ease but the stapes could not be removed owing to its firm fixation. Neither case sustained any improvement from the operation.

Just a few words as to the technique of the operation. In all cases, a flap is made of practically the whole posterior quadrant of the membrana, putting the knife in behind the

umbo and carrying it upward close to the posterior edge of the malleus, then across posteriorly and down the posterior superior wall. This flap is then turned downward. The incudo-stapedial articulation is then cut and, whenever possible, from behind forward. The long process of the incus is then seized with a Sexton forceps and the ossicle removed by traction. The stapedius tendon is then cut and a blunt-pointed hook passed between the crura and the stapes and the stapes removed by traction a little upward and outward.

I have done the operation a number of times without any anesthesia but it is exceedingly painful to the patient and in most cases general anesthesia is advisable.

Curiously enough it will be observed that in both the cases I have reported, a complete and total deafness resulted from the operation. There was also an increase of tinnitus. I believe the lesion in this case to be a hemorrhage into the internal ear. In something over thirty stapes operations which I have done, this is a rare complication, certainly occurring in not over 5 or 6 out of 30 cases.

I present this paper with some hesitancy because I have not definitely made up my mind in just what cases the operation should be advised, but certainly in both these which I have reported, there can be no doubt of the wisdom of any procedure which offers relief.

In both instances it was carefully explained to the patient that the operation might completely ruin the hearing in the affected ear. In fact, I should always do this before removing the stapes at all.

Both patients had been unable to carry on their business, one for 6 months and the other for over a year and both have been completely relieved; the one for nearly 7 years, the other for 2. Both are in active business at the present time.

It will be observed that in the first of these two cases and also in the two unsuccessful cases which I have reported that Burnett's operation of removal of the incus alone was done and failed to give the patient any relief whatever. The contrast between the two cases where I was unable to remove the stapes and the two reported with successful removal, was very striking in this respect.

VIII.

ABRIEF CONSIDERATION OF PROGNOSIS IN CHRONIC SUPPURATIVE OTITIS, BASED ON THE RESULTS OF A YEAR'S TREATMENT OF SUCH CASES.

BY THOMAS J. HARRIS, M. D.

NEW YORK.

In spite of the many articles and discussions, the last word is yet to be spoken on "chronic suppurative disease" of the middle ear. Indeed to-day, because of the increased activity along the lines of treatment, the subject is of especial interest. No one can hope to do more out of the limited experience than to add a mite to the accumulated experiences of others and yet the question is so vital a one (for it concerns nothing less than life itself) that a clear and authoritative opinion is pressingly demanded on this question. "What is the future as regards the cure for the patient suffering from chronic discharge from the ear?" "What chance has he for the relief of his symptoms along conservative lines of treatment?" "What risk is he running, of sooner or later suffering from fatal complications?" These are the questions which every thoughtful aurist is continually asking and being asked. If the risk is so imminent for a fatal termination in every case, or in the great majority of cases in chronic otorrhea, a grave responsibility is placed upon the physician to advise an operation.

The writer recently, for a period of eighteen months, has had under his care at the Manhattan Eye and Ear Hospital, all the suppurative cases in the service of Dr. Wendell C. Phillips.

With a view to testing the value of treatment, each case has been carefully studied and the results of the treatment, as far as possible, accurately noted.

It is not forgotten how misleading the most painstaking of statistics may be and more than once it has been asserted

that many aural statistics have been made to order. This is emphatically denied in this case. The condition of the patient was carefully noted at the time of his first visit, by the examiner, Dr. Phillips, and improvement or otherwise during the course of treatment recorded, and the result at its completion. To render the results still more accurate, the condition of the patient's ear was at an interval of a year inquired into, postal cards being sent to all the cases to report at the clinic. These later records were in each case made by my assistant, the patients not being seen by me. Of over one hundred cases which came under my care, only some fifty odd were faithful in their attendance at the hospital, and thus permitted study and investigation. All surgical measures indicated, such as removal of adenoids, extraction of polyps and granulation tissue, were at first performed.

This done, it was sought to discover, irrespective of any necrosis of the ossicles, what result can be accomplished by medicinal treatment alone. In most cases the patients were seen every second or third day. On the whole, they were superior in intelligence to the usual hospital patient, and directions were generally properly carried out. In all instances an otorrhea had existed for many months and in most cases for years, with certain exceptions to be noted. Different methods of treatment were employed, including the so-called "dry treatment," in a limited number of cases.

The total number of cases treated, including a few private cases of which notes were available, was sixty-six. Of these, forty were discharged at the end of from one to six months of treatment entirely cured, fifteen greatly improved; eleven showed no improvement at all. Of the forty cases reported cured, five were cases of acute exacerbation of a former condition, and on account of partaking of the character of a simple acute attack, are not included in the total number of cases reported cured. Of the thirty-five cures, subsequent examinations at the end of a year's interval in twenty were made, showing relapse in two instances. Of the eleven cases not improved, representing 12 per cent., the radical operation had been advised and refused in four. In one an ossiculectomy had been performed some time previous to the beginning of the treatment, and in another the radical oper-

ation was performed with benefit, but without cure. It will thus be seen, that in the 55 or over 88 per cent., including the acute exacerbation, improvement or a cure was secured, and that in twenty, or over 50 per cent., of the cases reported cured, later reports show relapse in only two.

The following was the therapy employed in the cured and relieved cases.

Hydrogen dioxide.....	20
Formalin.....	9
Borolyptol.....	3
Camphoroxol.....	5
Menthoxol.....	1
Protargol	1
Boric Acid in alcohol (saturated solution).....	6

We employed in the topical treatment of chronic otorrhea, either the method by irrigation or the so-called "dry method." Without question the latter is the ideal method. Experience, however, teaches us that it is impracticable to use it in the hospital clinic, and the combination of the two has served us best. Usually a slip containing printed instructions is given the patient, specifying the steps of home treatment and thus avoiding mistakes. In some cases an antiseptic solution was only given. Formerly boiled water was ordered, but later a weak formalin solution, "10 to 20 drops of the 40 per cent., to the quart of hot water," has been substituted and, as Lucae has shown, proved much more satisfactory. In a few cases, 1-5000 bichloride solution was employed but did not work as well. This syringing was however usually preceded by the use of hydrogen dioxide in full strength. This was the routine method of treatment, and as will be shown in the cases reported, worked most satisfactorily. Indeed our use of this drug here and in many other cases for the past ten years convinces us that it is the most valuable single remedy that we can employ. The single objection to its use is the danger of its injuring the pneumatic cells and thus forcing inflammatory products before it. To our minds this is more of a theoretical than a real objection. It should be avoided however in cases of small perforations of the ear drum. In an extensive use of this antiseptic, we fail to recall a single case where un-

pleasant results have followed and where, subsequent to treatment, sagging of the superior wall with some mastoid tenderness took place. No subsequent note of the case was made, but as far as we know no further discomfort followed. In six cases, camphoroxol and menthoxol were substituted. These are the synthetic products of peroxide, camphor and menthol. They must usually be employed in dilution, 25 to 50 per cent, otherwise they cause pain.

We fail to see that they have any advantage over the plain peroxide. The treatment was concluded by a thorough dry cleansing with cotton on a match or tooth pick. This was repeated two to three times a day according to the condition of the ear. In cases where the secretion was scant and the patient showed a sufficient degree of intelligence, a dry treatment was employed, followed by the use of a saturated solution of boracic acid in alcohol, to which was added as suggested by Dr. J. F. McKernon, a small quantity of 1 to 1000 solution of bichloride. As an astringent where scant granulation tissue is present, this formula was by far the most efficient of anything employed. Where a greater amount of granulation tissue existed, in addition to curetting, chromic acid, protargol and nitrate of silver were the drugs employed. The value of the local treatment to the ear was greatly enhanced by proper attention to the nose and nasopharynx. Indeed most cases of fresh attack proceed from this region. In children a course of codliver oil and iron is almost always indicated. This plan of treatment has, as has been shown, given a very excellent result in a large number of our cases.

How long was the treatment usually continued and how long should it be persisted in? We are of the opinion that the ordinary minimum of time of two to three weeks, given as the period when, if improvement is not pronounced, operative measures should be employed, is altogether too short. In many cases we will need to persist for weeks and even months to effect a complete cure. It is equally true that an indefinite course of treatment in most cases is to be condemned. Cases are seen coming to our hospitals for years without any beneficial results. This is all wrong. The average duration of time of the treatment in the cases reported

was from two to three months. What if the discharge is not controlled in a reasonable time? Here we touch the most debatable question of the hour to the aurist.

Many cases at the first examination, on account of the pronounced necrosis of the ossicles, warrant the most dubious prognosis only, with local treatment, and the briefest course of such treatment should be employed; the value of ossiculectomy in such cases is not open to question. The operation as far as severity is concerned, is beyond objection. Where the ossicles are gone in whole or in the greater part the question is a different one. Shall we advise the so called radical operation? The writer is aware how enthusiastic many of his colleagues are at present on this measure. He does not forget their strong argument of the eminent risk to life in an uncured otorrhea. It is undoubtedly true that the disease in many instances has extended woefully near fatal structures, yea that death itself has resulted. But is the risk as great as portrayed? We feel amid all the brilliant work in aural surgery a conservative note should be struck. The protecting care of nature in such a case is to apt to be lost sight of. It is our opinion that in many cases this natural wall of protection will prove amply sufficient. It is not to be denied for a moment that we meet cases where this complete operation is properly indicated, but we feel it is gravely open to doubt whether a slight uncured otorrhea without other symptoms is sufficient to demand it.

The recent statistics of Schwartz's clinic show that in some one hundred radical operations the hearing was rendered worse in over 33 per cent. This deserves sober reflection. It is a simple matter to advise such an operation and perform it in the hands of a skilled operator without risk to life, but let us not forget what it means to the patient. The man probably has impaired hearing already. The loss of hearing means to him the loss of occupation, not to speak of virtual exile from his fellow men. And the result of such loss of occupation is often more serious than the loss of life itself. Of the wisdom of conservatism, Miss R., one of the cases reported, is an illustration. A long standing otorrhea developed an acute attack with mastoiditis. The question whether the operation should be performed was carefully

considered. The young lady was a school teacher with all the hearing lost in the well ear. A simple mastoid operation was finally decided upon. To-day the patient is entirely well, all the otorrhea has ceased and the hearing remains unimpaired.

Nor is the patient entirely free from risk of danger to life. In the hands of two expert operators, two cases known to the writer have resulted fatally during the past year. Further in addition to the time lost from work, which in not a few instances is considerable, a complete cessation of the discharge is not always certain.

One of the 11 cases reported as not improved is an illustration of this. After a most thorough operation there is still at the end of six months, some discharge from the ear. It is instructive in this connection to refer to the opinion of some of the leaders of otology abroad. At the Sixth International Otological Congress held three years ago in London, this subject was under discussion. While Macewen among others took extreme grounds upon this question of when to operate, Politzer the nestor of the profession, expressed himself as follows; although he was a strong advocate of the radical operation in suitable cases, he could not agree with those surgeons who performed it often for the mere purpose of stopping the discharge, at least not until strenuous efforts had been made to stop it by other means. He thought in these cases it was not justifiable to have recourse to an operation which, although not dangerous in the hands of a skilled operator, was still a serious one, especially when they considered; 1, the many important structures in the vicinity, which might be injured; 2, the possible permanent impairing of hearing in those who before the operation could hear fairly well; 3, the protracted healing after the operations which very often renders patients hors du combat for many months.

Dr. McBride, of Edinburgh, agreed with Politzer, Lucae and Guye in their conservative method with regard to mastoid operations. Gradenigo said, "For the purpose of healing simple pathologic conditions of the tympanic cavity, the extraction of the ossicles or even of the hammer only, and removal through the exterior auditory meatus of the pos-

terior superior bony wall, were for the most part proven sufficient." In such cases the retroauricular method did not give better results: At this meeting Kuemmel, of Breslau, referred to a class of cases of which the writer has had an illustration, viz., hysterical girls. They are able to imitate any kind of symptoms. One case he operated on for the fifth time and never found anything. The skull had been trephined over and over until there was a defect the size of the palm of the hand. Still every six months she became ill with the same symptoms; she reproduced all the appearances of dizziness; she showed facial paralysis, she had a temperature of 104 1/2 F. This girl is quite well now with over 20 punctures of the brain and 7 narcoses.

The case in our own practice has been presented to the otologic section of the New York Academy of Medicine. There had been an old suppurative process with loss of mt. and ossicles, which was healed. A mastoid operation was performed for continued mastoid pain and tenderness with negative findings. The pain returned after six months over the supramastoid region. It was periodical only, nothing was seen in the ear though the probe detected rough bone. There was an elevation of temperature of one degree. In the discussion of the case, a radical operation including exploration of the brain was advised by several prominent members of the section. Under the care of the hospital neurologist, the case fully recovered; it was diagnosticated by him as a neurotic condition. The statement of one writer already quoted (Richards) is most decidedly open to question. He says, "The question of the influence of operative measures upon the hearing power is not very much of a factor in these cases, since the danger to the individual is more to be considered than any possible influence which the operation may have upon the hearing power. It is usually benefited by an operative procedure, since material which is a hindrance to the passage of the sound wave is removed by the operation, but may now and then be diminished."

From the first of these assertions we must decidedly dissent. As we have said before, the loss of hearing is a most serious matter. To a man dependent on his own exertion it may mean even existence itself. To every one it means vir-

tual exile and misery, worse than loss of life. This is further borne out by the reports of results in the hands of the leading operators, according to this method. Thus Stacke had in 37 cases, 27 cures; Panse in 57 cases, 31 cures; Grunert in 43 cases, had 24 cures. In Panse and Grunert's cases this meant only 54 and 52 per cent. respectively. These certainly are not the most encouraging of statistics. Nor can we with any just degree of confidence offer our patient, who trustingly puts himself in our hands, an all but positive assurance of a cure. Let us not forget that such a cure may extend not over 10 days of hospital treatment as in the favorable cases, but for weeks and months.

Complications of an annoying is not dangerous character may occur from the operation. Facial paralyses are becoming alarmingly frequent. While it is true that for the most part they may clear up, they are not less disagreeable, and especially so because occasionally they do persist for months and even permanently. Nor is our chief hope of a lasting cure always realized. This seemingly entirely healed cavity will occasionally take an infection through the Eustachian tube or otherwise. We would be sorry to be misunderstood. We most freely admit that indications arise every day, such as intracranial complications, where there can be no question of the need of such operations. It is the dictum recently put forth and acted upon, that chronic or intractable otorrhea, per se, without other symptoms is an indication for radical operation, that we may venture to question. Such a view is expressed by one writer in the words, "Every case of suppurative otitis media is a slumbering volcano or a charge of dynamite liable to explode at any time." Yet this writer quotes statistics to show that in 9000 autopsies at Guy's hospital, only 2-3 of 1 per cent. died of intracranial complications, while Gruber in 4000 autopsies found only $\frac{1}{2}$ of 1 per cent., and Koerner, an authority on cerebral lesions, following aural diseases, saw only two cases in 2207 ear cases. As to the statement that such loss of hearing rarely occurs, the figures from Panse and Grunert just cited, have only to be borne in mind.

Finally, to show that after all we have not been speaking too pessimistically, we would like to quote from one who has

had a very large operative experience and who has never been accused of over-conservatism. Dench, in his recent paper read in Washington before this society says: "My own experience with the radical operation leads me to believe that the surgeon is not warranted in promising the patient that the hearing will be as good after the operation as it was before, unless at the time of operation the power of audition is very greatly diminished in the affected ear. While during the course of the operation the surgeon may not injure any of the delicate structures within the tympanum, in those cases where the mobility of the stapes approaches anything like the normal standard, a certain rigidity of the ossicles must necessarily take place as the result of the epidermization of the tympanic cavity. In cases where the audition is good, the possible effect upon the hearing, other things being equal, will cause the surgeon to choose the simple operation of ossiculectomy rather than the more radical procedures." The author's own statistics and words show that the results of the two methods, viz., the simple and radical, vary very little as regards the cure of the discharge. We quote, "In these cases reported by Panse we find as the result of the radical operation, 54 per cent. of cures, while Grunert reports 52 per cent."

Referring again to the statistics of the simpler operation it will be remembered that of Grunert's cases, 46 per cent. were cured; in Ludwig's cases, 51 per cent.; and Schroeder's cases, 48 per cent. It will be seen therefore that with a few exceptions, the percentage of the cures is not so much greater for the radical operation than it is for the more simpler procedure. Such being the situation for actual results, consider for a moment the difference as concerns hearing. Dench says, "In my experience the result of ossiculectomy has seldom been to reduce the hearing but has in many cases materially improved the power of audition. Conducted carefully the surgeon can practically promise the patient that barring accident, the hearing after the removal of the ossicles will be no worse than it was before and will probably be some improved. In 130 ossiculectomy cases reported by Schroeder, hearing was improved in 65 per cent., 22 per cent. remained

the same, in 13 per cent. only was it impaired. Ludvig's 43 cases showed impaired hearing in only three, improved in seventeen, unchanged in nineteen, unknown in two.

We think we have said enough to show that a conservative view on so grave a subject is not without just grounds. No stronger testimony is needed than the author just quoted. It is too often lost sight of that it is or should be the surgeons greatest pride to say as Lucae says, "Not that I have operated on so many patients, but that I have cured so many patients without operation." We venture in conclusion the following deductions:

1. Chronic otorrhea in a large percentage of cases is amenable to suitable medical treatment.

2. In addition to proper attention of a general character and to the naso-pharynx, peroxide of hydrogen with or without formalin solution, gives the best results, all minor operative procedures of course first being attended to when necessary.

3. The results of such treatment are in a good number of cases permanent.

4. The risk of an uncured otorrhea with good drainage is relatively very small (1/2 or 2/3 of fatalities).

5. Medical treatment failing, after a suitable interval of time, the danger of fatal complications in absence of all symptoms should be laid before the patient and the promise of relief by operation stated.

6. Where there is no good reason to the contrary such as intracranial or mastoid complications, the intratympanic method by ossiculectomy should be preferred.

- (a) Because its results as regards the cure are equally good.

- (b) The risk to loss of hearing is vastly less.

- (c) The danger of unpleasant sequelae, such as facial palsy is avoided.

- (d) The possibility of prolonged after treatment is obviated.

7. The radical operation is not without risk to life.

8. Where ossiculectomy fails or mastoid or other symptoms exist pointing to extension of the disease into the bone, the radical operation then becomes the suitable and valuable method of relief.

9. The protecting and assisting power of nature is never to be lost sight of.

IX.

OTOSCLEROSIS OR SPONGIFYING OF THE CAPSULE OF THE LABYRINTH.*

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Before the tuning-fork tests were introduced as an aid in diagnosing labyrinthine from middle ear deafness, cases presenting the clinical picture of gradually increasing deafness which ran their course without any catarrh of the middle ear and in which the physical examination revealed none of the well-known marks of catarrhal inflammation of the middle ear, were diagnosed as primary disease of the labyrinth, "nerve deafness."

With the aid afforded by the tuning-fork tests, these cases were divided into two distinct groups. The first group included those cases where a shortened bone conduction and a positive Rinné showed defect in the sound-perceiving apparatus, cases of labyrinthine deafness. The second group included the cases where a prolonged bone conduction together with a negative Rinné and a marked degree of deafness for tones at the lower end of the scale showed an obstruction in the sound-conducting apparatus, cases of middle ear deafness.

These latter cases, although the Eustachian tube was normal and the membrana tympani showed none of the marks of middle ear catarrh, were classified as the sclerotic type of the dry chronic middle ear catarrh in distinction from the hypertrophic type where a more or less contracted tube together

* Read before the Chicago Laryngological and Climatological Association, Feb. 23, 1903.

with a retracted and thickened membrana tympani gave positive evidence of inflammatory changes in the middle ear.

These cases of so-called sclerosis of the middle-ear, it has long been known, do not improve under treatment, but in spite of all treatment, as a rule grow worse and worse, often terminating in total deafness.

Post-mortem examinations of cases diagnosed as sclerosis made by Politzer, Bezold, Siebenmann and others, have revealed the fact that the pathology of this condition consists in the development in the bony capsule of the labyrinth of nodules of spongy bone replacing the previously existing ivory-like bone of the capsule.

The clinical picture usually presented by these cases of obstruction in the sound-conducting apparatus, namely prolongation of bone conduction with markedly negative Rinné and a marked degree of deafness by air conduction for the lower tones, is explained by the fact that the newly formed bone nodules usually develop about the fenestra vestibuli, producing quite early in the disease a bony ankylosis of the stapes and the typical symptoms of obstruction in the conducting apparatus. As the disease progressed, however, and the structures of the cochlea became more and more involved, symptoms of beginning labyrinthine deafness were often superimposed on those of the middle ear type.

A physical sign often seen early in these cases, a sign first noted by Schwartz, is a reddish lustre transmitted to the membrana tympani from a congestion of the blood vessels on the inner wall of the cavum tympani. This sign is of positive value only when it is present, when it signifies that the condition is progressing. Its absence is of no value in diagnosis, since the congestion disappears entirely in the later stages of the disease.

Siebenmann was the first to report a case with post-mortem findings of multiple areas of spongyfying bone in the labyrinthine capsule and where the functional tests showed deafness of the labyrinthine type instead of obstruction in the conducting apparatus as usually found.

The diagnosis of this condition in a typical case can be made with certainty. If in a case with gradually increasing deafness, the membrana tympani is found normal or with the

reddish lustre transmitted from the wall of the promontory and the Eustachian tube is open, while the tuning-fork tests show loss of perception for the low tones, a decidedly negative Rin  , and prolongation of bone conduction, the diagnosis of sclerosis is positive. When, however, this condition develops in a case previously the seat of some middle ear trouble, either catarrhal or suppurative, or when the condition takes an atypical course, as in the case referred to above, producing labyrinthine deafness, the diagnosis in most instances must remain in doubt.

Various terms from time to time have been applied to this condition based on the existing conception of its pathology. The term sclerosis of the middle ear was the term first used to distinguish this condition from the hypertrophic form of chronic catarrhal otitis media. The term was based on a misconception of the pathology of the condition, since later investigation has demonstrated the absence in this disease of a sclerotic process in the middle ear. Ankylosis of the stapes is another term that has been used and while it expresses clearly the pathological condition that produces the prominent clinical symptoms of an obstruction in the conducting apparatus often presented in these cases, it is not an entirely satisfactory term. In the first place, other pathological processes besides spongifying of the labyrinthine capsule may produce fixation of the stapes in the fenestra vestibuli, and in the second place, this condition of spongifying of the labyrinthine capsule may develop, as Siebenmann has found, in various parts of the capsule and produce as the prominent symptoms those of labyrinthine deafness instead of the symptoms of primary fixation of the stapes. Politzer has used the term capsulitis labyrinthi and Siebenmann that of spongifying of the labyrinthine capsule. In a recent number of the *Annals of Otology, Rhinology and Laryngology* is an article on this subject referring to the process as otitis media insidiosa. The process is not an otitis media at all, but a disease of the bony capsule of the labyrinth which through its early fixation of the stapes often produces the clinical picture of obstruction in the sound conducting apparatus.

I have here to present a case showing the typical picture of labyrinthine deafness but where the probable diagnosis of

disease of the capsule of the labyrinth without fixation of the foot-plate of the stapes has been made as the condition that will best explain all of the symptoms presented.

The history of the case is as follows: Mr. T., aged 27, a university student in good general health. He has had no serious illness and has never had syphilis. He knows of no deafness in any member of his family; nor has he had any ear trouble previous to the present one.

About three and one-half years ago tinnitus began to develop insidiously in the right ear. At first it was noticed only on waking in the morning, when everything was quiet. In the course of several months the tinnitus was noticed also during the day. It was associated after a short time with slight deafness and a sensation of fullness in the ear as though the ear was stopped up. About six months after the involvement of the right ear, the same symptoms began to appear in the left ear. The tinnitus is continuous in both ears and in the right ear is pulsating in character. He likens the tinnitus to the roar produced by the wind in a forest. The deafness has been gradually increasing and he says it has progressed much more rapidly during the past six months. These are the only symptoms present. There has been no dizziness or vertigo.

A physical examination found the nose and nasopharynx normal, the Eustachian tube normal and patent. The membrana tympani had a perfectly normal appearance, showing not a trace of retraction or thickening. Cone of light normal. Spread over the entire membrane was a diffuse reddish lustre, transmitted from the wall of the promontory.

Functional examination gave the following results: Whispered voice could be heard in the right ear only when spoken with force and close to the meatus; in the left ear it could be heard at a distance of six inches from the meatus. In the Weber test the fork was lateralized distinctly in the left or better hearing ear. The Schwabach test showed a marked shortening of the bone conduction. The Rinne test was positive for both ears. The C fork (64 d.v.) was heard in both ears almost as long as in a normal ear, while the c⁴ fork was shortened about 45 seconds. The functional tests gave the usual results of a typical case of labyrinthine deafness.

The age of the patient, the normal condition of his general health and the absence of any constitutional disease that might produce disease of the labyrinth, the absence, moreover, of any known cause for primary disease of the labyrinth, such as syphilis, occupation, injury, etc., the absence, too, of the characteristic symptoms of Menière's disease, these together with the insidious development of the symptoms of tinnitus and deafness of the labyrinthine type, led me to suspect the possibility of a primary disease of the bony capsule of the labyrinth in which the spongifying process, however, did not cause primary fixation of the stapes but had developed in the lower end of the basal coil of the cochlea, producing the typical symptoms of labyrinthine deafness. This diagnosis was made all the more probable from the result of the physical examination, which, in the absence of any sign of catarrh of the middle ear, revealed on the membrana tympani the typical reddish lustre transmitted from the wall of the promontory, characteristic of otosclerosis.

To pronounce this case positively one of spongifying of the labyrinthine capsule may hardly seem justifiable, considering the very limited knowledge we have regarding the possible clinical course and the possible symptoms that may be produced by this process, especially when it develops in parts of the capsule not in the region of the fenestra vestibuli, as in the case of Siebenmann referred to above. From this case it has been shown that the spongifying process may develop in various parts of the labyrinthine capsule, and, instead of producing the usual symptoms of anchylosis of the stapes, it can produce the symptoms of labyrinthine deafness.

In the case reported here the clinical history together with the physical findings, for reasons stated above, would seem to justify the diagnosis of otosclerosis or spongifying of the labyrinthine capsule involving the basal coil of the cochlea, and without producing anchylosis of the stapes.

X.

ANGIOMA OF NASAL SEPTUM.*

BY IRVING E. KIMBALL, M. D.

PORTLAND, MAINE.

J. P. R., a clergyman, 56 years of age, presented himself to me with the following history. For a few years preceding he had been troubled with nasal obstruction, a slight discharge, yellowish in color and rather thick in consistency. He had consulted a physician who told him he had chronic nasal catarrh and who prescribed for him a nasal spray. About one year from this time he began to have troublesome hemorrhages from both nostrils. These increased in intensity to such a degree that he was advised to see a specialist. He unfortunately drifted into the hands of one of newspaper notoriety who told him that he had ulceration of the septum and that he must submit to a course of treatment which as he said consisted of sprays and blood medicines. The hemorrhages continuing to grow worse and his general health beginning to suffer so much as to interfere with his preaching he decided to consult some one else and presented himself to me for examination and treatment. The patient presented a sorry picture, inability to breathe through either nostril, almost daily hemorrhages, markedly anemic in appearance, exceedingly nervous, inability to concentrate his thoughts on his work, and a determination to give up preaching. On examination I found a large sized bilobular growth, pedunculated, hanging from the right nasal cavity, situated not far from a point opposite the inferior turbinated bone, on the septum, bleeding quite freely at the slightest touch and pulsation easily made out by simple inspection. In the

*Read at meeting of Eastern Section of the American Laryngological Rhinological and Otological Society held in Boston, Feb. 14, 1903.

left nostril slightly lower down on the septum was a sessile single lobed growth in which no pulsation could be made out which also bled at the least amount of probing. In my examination I started up so much of a hemorrhage that I hesitated about operating that day. I told my patient that he had bleeding tumors which I thought ought to be removed at once and that their removal might prove very troublesome to us both. The following day I operated with a cold snare on the right side, the time consumed being an hour and three quarters in its removal. I had no sooner removed the growth when a most alarming hemorrhage ensued which for some time baffled my efforts for its control. I actually thought my patient might bleed to death at that time, however, after what seemed hours to me I did get it under control sufficiently to thoroughly cauterize the surface with a galvano-cautery. The patient had no trouble from this time on and at the end of ten days came in for the removal of the growth from the left side. Here I transfixed the tumor with a transfixing needle and passing a wire over that succeeded in removing this. I got a moderate amount of hemorrhage in this case and used chromic acid quite freely to the base. I saw the patient several times within the year following the removal of these tumors and there had been no recurrence. Since then I have lost trace of the patient as he has gone to the West to reside. An examination was made of both growths with the following report: Both tumors were composed of blood vessels, held together by connective tissue, some of the vessels being lined with epithelium; both round and spindle shaped cells were found in the connective tissue. Blood spaces were abundant. Undoubtedly angioma.

Authorities seem to differ somewhat as to the frequency of these growths. Dr. F. C. Cobb in his report of a case in the Boston Medical and Surgical Journal of November 23, 1893, speaks of the rarity of these cases. In his research after cases he could obtain but 19 in all and some of these were of doubtful diagnosis. He furthermore says that out of 7429 cases examined at the Massachusetts General Hospital, his was the only reported. Dr. Kyle in his work on Diseases of Nose and Throat says, "Angioma of the nasal passages is of rare occurrence. There is no doubt that these growths are

more often found on the septum than on the turbinal bodies." Dr. Jonathan Wright in his recent work says, "These tumors are not so rare as has been represented," and refers to reports of cases from German and American literature, about thirty in all.

I know of no other instance in which angioma has been found in both nasal cavities and this fact in my case is largely the reason for my reporting it to this Society.

XI.
THE ETIOLOGY, PATHOLOGY AND SYMPTOMATOLOGY OF ACUTE SUPPURATION OF THE MIDDLE - EAR.*

BY EDWARD BRADFORD DENCH, M. D.

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An acute middle-ear suppuration is invariably caused by the introduction of some pathogenic germ into the tympanic cavity. This germ gains entrance either through the external auditory meatus, there being a solution of continuity in the drum membrane, or through the Eustachian tube, the drum membrane remaining intact. In addition to the introduction of the pathogenic germ, certain conditions of the middle-ear must be present which render this region a favorable site for the development of the pathogenic germ introduced. In other words, the diseased organism which gains entrance to the middle-ear is the exciting cause of the inflammation. The changes which make the middle-ear a favorable nidus for the development of this germ, constitute the predisposing causes of such an inflammation.

Turning now to the predisposing causes of an acute middle-ear suppuration, we would cite, in the first instance, any condition which conduces to a chronic congestion of the upper air tract and of the tympanum. These two regions are so intimately related, anatomically, that a venous hyperemia in one cannot fail to produce a corresponding condition in the other. Such a predisposing condition then exists whenever we have an obstruction to nasal respiration such as is caused by a chronic hypertrophic rhinitis, an acute rhinitis, an acute inflammation of the naso-pharyngeal space, or an hypertrophy of the lymphatic tissue situated in

*This and the succeeding five papers which constituted a symposium before the New York County Medical Society, are published through the courtesy of the New York Medical News.

this region, constituting the condition commonly known as adenoid vegetations, or enlargement of the pharyngeal tonsil. These may be considered as the local predisposing causes. The general predisposing cause which, without any lesion of the upper air tract may render the middle-ear exceedingly susceptible to infection, may be any constitutional condition which lowers the vitality of the entire system. Among the chronic diseases we may mention chronic cardiac disease, chronic nephritis, anemia, either simple or pernicious, diabetes and so forth. Among the acute diseases we may have pneumonia, diphtheria and the exanthemata; all of these conditions, tending to lower the general nerve vascular tone of the body, render all regions more susceptible to any infection, and the middle-ear does not escape this general predisposition.

Next we come to the direct or exciting cause of the inflammation, that is, the means by which the pathogenic bacteria are introduced into the tympanum. The most simple avenue of introduction, and at the same time perhaps one of the most unusual, is through the external auditory meatus. The etiologic factor is operative in those cases of acute middle-ear suppuration which follow any perforating wound of the membrana tympani. We all know that in healthy individuals, the membrana tympani may be perforated accidentally, and, in a very large proportion of cases, unless an effort is actually made to introduce some pathogenic germ, such an injury is frequently not attended by suppuration. Given any of the predisposing causes already enumerated, however, and a wound of the drum membrane will almost invariably be followed by a purulent inflammation. This fact is of importance, clinically, in dealing with cases in which permanent perforation of the drum membrane exists. In these cases, an acute purulent inflammation not infrequently occurs as the result of neglect, either on the part of the patient or of the surgeon, through the actual introduction of septic material through the meatus.

The middle-ear is most commonly infected through the Eustachian tube. Bacteriologic investigation of the secretion from the naso-pharynx in healthy individuals almost always shows the presence of a certain number of pathoge-

nic bacteria.* The investigations of Preysing would seem to show that under normal conditions the tympanic cavity contains absolutely no bacteria of any description. Hasslauert on the contrary, in a series of similar investigations has apparently proven that the tympanic cavity frequently contains various forms of bacteria, such as diplococci, pneumococci, staphylococci, Friedlander's bacillus and occasionally streptococci. These investigations are cited simply to prove that given a normal mucous lining of the middle-ear, pathogenic bacteria may be present not only in the naso-pharynx, but may even exist in the middle-ear itself, without causing a suppurative inflammation. Given, however, one of the predisposing causes already mentioned, together with the presence of these pathogenic organisms, even in small quantities, and a purulent inflammation results.

Time does not permit of my going further into the etiology of the condition. It will easily be seen, if the preceding remarks have been followed that an acute suppuration of the middle ear must necessarily be a not infrequent complication of any acute infectious disease, particularly of those diseases in which pathogenic germs are found in large quantities in the naso-pharynx. I here refer to measles, diphtheria and scarlet fever. From a clinical point of view, one of the most common etiologic factors is the direct introduction of pathogenic germs through the Eustachian tube by the insufflation of water through the nares. This occurs most frequently as an accident during bathing, but may follow the use of the nasal douche, too often, I am ashamed to say, advised by the medical attendant. Here, again, the predisposing factor plays an important part. It is probable that in many instances, water that is not perfectly sterile has entered the middle ear, and has failed to cause any inflammation whatever. This accident, however, if associated with one of the local predisposing causes already mentioned, is almost certain so be followed by serious consequences.

Turning now to the pathology of the condition, we find

*Centralblatt f. Bakteriologie, "Die gesunde menschliche Paukenhohle ist keimfrei," 1899, Vol. 25, p. 535. (I. Abtheilung.)

†Klinische Vorträge, aus dem Gebiete der Otologie und Pharyngo-Rhinologie, Nov., 1901, p. 177.

that whenever we have purulent inflammation of the middle ear, this inflammation involves the upper portion of the tympanic cavity, that is, that portion of the middle ear lying above a horizontal plane passed through the short process of the malleus. This region contains numerous reduplications of mucous membrane which pass between the bodies of the ossicula and the adjacent tympanic walls. A suppuration in this portion of the tympanic cavity is always purulent, and invariably indicates that the infecting germ is of sufficient virulence to attack connective tissue. This, in contradistinction to an acute catarrhal inflammation, which is always limited to the lower portion of the tympanic cavity, a region but poorly supplied with connective tissue. We may frequently have an acute catarrhal inflammation of the middle ear, which may run its course without producing a suppuration. Even in those cases which go on to rupture of the drum membrane, the discharge is sero-mucous in character, and disappears in the course of a few days. An examination of this discharge invariably shows that the pathogenic organisms are of the milder variety, such as the staphylococcus or some of the less virulent form of diplococci. When we have to do with a streptococcus and, in a great majority of cases, with a pneumococcus infection the upper part of the cavity is almost always involved. It should also be remembered, in considering the pathology of the condition, that a simple acute catarrhal otitis, in which the infective germ is of low vitality, or in which the bacteria are only present in small quantities, may easily be transformed into an acute suppurative otitis media, involving the upper portion of the tympanic cavity, unless proper measures are taken, such as keeping the parts absolutely sterile to prevent any infection from without. We see this especially in hospital practice, where the patients are not as cleanly as they might be. A patient, presenting at first an acute catarrhal otitis media, will appear later on with this transformed into an acute suppurative otitis media, involving the upper portion of the tympanic cavity, the change in the case being entirely due to infection of the middle ear through the external auditory meatus.

I have dwelt so long upon the etiology and pathology of

this condition, that I have but little time left in which to speak of the symptomatology. Fortunately, but little need be said upon this subject. The first symptom of which the patients complain is a feeling of stiffness in the ear, quickly followed by actual pain. This pain, in a suppurative otitis, increases rapidly until it becomes agonizing and almost unbearable. In addition to the pain, the patients usually suffer from subjective noises, impairment of hearing, and there may be vertigo and vomiting. There is also, in most cases, an elevation of the body temperature. In adults the temperature ranges anywhere from 99° F. to 101° F.; in children it frequently rises to 104° F. or 105° F., or 106° F. The symptom of greatest importance in infants is undoubtedly this sudden increase in temperature. Given the case of a child suffering from one of the exanthemata in which, after the appearance of the eruption, the temperature has run its characteristic course and fallen to nearly the normal standard; suddenly, without any apparent cause, the temperature rises three or four or five degrees, and the infant seems a little restless. Such a condition should always lead to a careful examination of the ears, knowing, as we do, that this portion of the economy is exceedingly prone to be involved during the course of one of these acute constitutional diseases.

XII.

COMPLICATIONS OF ACUTE MIDDLE-EAR SUPPURATION.*

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[1] Since the subject-matter involved in the title of this paper is sufficiently extensive to fill a volume of considerable size it will be quite impossible to attempt more than to mention those sequelae that are apt to occur in the course of this disease, and which often form a part of the general practitioner's experience.

The consequences of an acute otitis limited to the auricle and auditory canal assume quite a number of pathologic changes. Chief among them is the otitis externa, or diffuse inflammation, which extends over more or less of the cutaneous surface of the auditory canal and in severe attacks involves the auricle as well. When the inflammation is very intense, the periosteum lining the osseous canal is implicated in the morbid process, which adds to the suffering of the patient, and produces a partial or complete closure of the canal. The presence of this condition not only interferes with making a satisfactory examination of the ear drum, and offers an obstruction to the performance of a successful paracentesis, but, in addition, closes the natural outlet for middle ear drainage. It is sometimes very difficult to distinguish between otitis externa and middle ear inflammation when the swelling is limited to the inner part of the canal. The inflammatory process, when of mild character, ends in resolution, still it often passes on to exudation and exfoliation, then the process gradually abates.

Mastoid periostitis is frequently observed as a result of

*Read before the County Medical Society, Sept. 22, 1902. Second paper of Symposium.

middle ear suppuration. When we study the development of the temporal bone and grasp the variety of conditions it presents at various ages of life, the occurrence of this complication, particularly in babies and young children, ceases to be much of a problem. In the young we find that the mastoid antrum is separated from the overlying soft parts by a very thin layer of bone richly perforated by various channels, along which inflammation may readily extend; then the fissures or sutures which remain open until puberty and sometimes never completely ossify—the squamo-mastoid fissure being the one in this region—for a pathway which facilitates the rapid extension of inflammation from the internal to the external mastoid cortex. In such a manner large collections of pus may form behind the ear before the membrana tympani ruptures, showing that the pus has followed the path of least resistance. More or less pain ushers in an attack which is followed by redness and swelling of the soft parts above and behind the auricle. The auricle soon takes the characteristic position of being pushed forward and downward almost at right angles to the skull. The extent of surface involved by an abscess may be limited to the mastoid region or reach from the tissues in the neck to the vertex. Occasionally we find inflammatory diseases limited to the soft parts of this region which are quite independent of any previously existing otitis; therefore a careful inspection of the ear drum is necessary in all cases before a correct diagnosis is possible.

Inflammation of the mastoid cells is most apt to occur as a complication when there is delayed perforation of the drum, insufficient drainage, and an impermeable Eustachian tube. This subdivision of the ear is the natural outlet of the tympanum, but through an early participation in the inflammation its tympanic mouth is tightly closed, and unless there is an artificial outlet made for the purulent accumulation, the anatomic relations of the tympanum, antrum and mastoid cells, offer an almost unobstructed path for its extension. One of the most reliable indications of a beginning attack of acute mastoiditis, is the persistent excruciating pain. Tenderness on pressure over that part of the mastoid known as the antrum, and over the tip of the

process, associated with more or less swelling of the soft parts, are generally present. Fever in children is usually pronounced in the early stages, while in adults its exclusion does not necessarily indicate an absence of the disease. Symptoms of septicemia are by no means rare, and delirium, when present, does not mean a fatal issue. Obliteration of the posterior auricular fold is a symptom usually indicative of mastoid periostitis, which, when following an attack of middle inflammation, demonstrates the presence of inflammation of the mastoid cells. All signs of mastoiditis, except pain, may be absent and it is usually encountered in those cases where the cells have become obliterated through some prior pathologic process. A sinking of the upper posterior auditory canal is considered either a reliable symptom of mastoid empyema, or inflammatory activity located within the mastoid antrum.

As a result of continued pressure of pus within the tympanum, there may be destruction of the soft parts here and there, which ultimately leads to superficial caries of the osseous structure, and one of the anatomic divisions frequently seen to suffer in this way is the Fallopian canal. While facial paralysis is generally observed as a result of long standing inflammation, occasionally more or less paralysis follows in the progress of an acute otitis. This complication is most often seen in young children where there is a lack of osseous development of the Fallopian canal, thereby making inflammatory extension to the exposed portion of the nerve comparatively easy.

Adenitis of the cervical and post-auricular glands is often seen as a complication of acute otitis, but it rarely extends beyond the point of producing some degree of tenderness. Where the mastoid is extensively involved a true suppuration of the glands may follow. This is especially true in the tuberculous and strumous diatheses.

Retro-pharyngeal abscess as a result of purulent inflammation of the tympanum, may occur through an extension of pus into the Eustachian tube, which is apt to induce dysphagia and dyspnea.

Although the proportional occurrence of intracranial inflammation following acute middle ear suppuration has not

as yet been definitely determined, its frequency is no longer a matter of speculation. The construction of the temporal bone with its many cavities and intercommunicating air spaces tends to favor the retention and decomposition of pus, and its intimate relation to the other component parts of the skull permits the various pathologic micro-organisms easy ingress not only to the cranial cavity, but to all parts of the economy through infection of the large venous channels lying in close proximity. The routes by which the inflammation is most apt to extend are by the tympanic roof and the inner posterior wall at the concavity for the sigmoid sinus. Septic material easily penetrates and extends along the many apertures for blood vessels and lymphatics that richly perforate the bone in all directions, while the unossified condition of the petro-squamosal fissure, through which a fold of dura mater passes and lies in direct contact with the mucous membrane of the middle ear, often leaves no effectual barrier to check the inflammatory advance, no matter what its nature may be. Although it is generally conceded that the greater number of cerebral complications follow the chronic form of middle ear suppuration, the danger of widespread infection from acute suppuration is becoming more widely recognized. There is more or less of a localized meningitis in nearly every severe case of acute otitis suppurativa in young people, which, fortunately, rarely develops into a general basilar meningitis, although a lack of proper treatment at the right time may aid it in becoming so. The presence of carious bone is more dangerous to the dura than the open condition of the sutures, for these bone defects are often so firmly closed with fibrous tissue that an excellent protection is thereby afforded to the overlying meninges. I believe it was Brieger who reported a number of sections made on the temporal bone in cases of acute otitis where the sutures were found to be protected in this way, and in no instance was there any indication of the purulent process entering the middle cerebral fossa. While this result is remarkable, and seemingly somewhat accidental, it nevertheless offers an explanation why inflammatory extension is so rapid in some cases and so slow in others, as this anatomic condition is by no means a constant factor. Meningitis,

inflammation of the lateral sinus, and extradural abscess, are the critical complications apt to follow severe attacks of acute middle ear suppuration, although much may be accomplished in the early stages of the otitis to prevent their development. Rapidity of inflammatory extension is nearly always seen in the cases of influenza infection.

In conclusion, let me say that in all obscure diseases of children, repeated and careful examinations of the ear should never be neglected, for the excellent work of Ponfick, who made 100 autopsies upon infants dying of various acute and chronic diseases, where in the majority of the cases, middle-ear inflammation was not suspected, showed nevertheless that it was present in all but nine of them. He believes therefore that the tympanum acts as an incubator and generator, promoting toxic symptoms in localized infective diseases. Pomeroy, of Boston, has verified this observation in a very able paper.

XIII.

THE TREATMENT OF ACUTE SUPPURATION OF THE MIDDLE EAR.

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In the brief time allowed for the presentation of this paper I shall attempt only to make a few practical statements outlining the present status of the treatment of acute middle-ear suppuration. A patient who is undergoing an acute suppurative process in the middle ear has, pent up in a bony canal, a quantity of septic material which usually finds vent by way of the tympanic membrane, but which may at the time find access to other, near-by and connecting bony cavities, often resulting in serious and, sometimes, fatal complications. Even in the simplest cases patients present the symptoms of sepsis as indicated by rise of temperature and rapid pulse. It is therefore of the utmost importance that these patients should be placed in bed, and remain there from the very commencement of the attack until the more acute symptoms have passed away. It is not customary to consider such patients ill enough to be so confined, but it should not be forgotten that a severe septic inflammation is in progress with elevation of temperature, rapid pulse and excruciating and exhausting pain. Confinement in bed aids greatly as an abortive measure as well as giving proper rest and protection from cold. Preventive treatment may be further outlined by referring to the many and varied opportunities for forestalling the attacks. There are certain diseases and diseased conditions which surely predispose to them.

First and foremost is the presence of adenoid tissue in the vault of the pharynx. This tissue is a hotbed for the retention and development of infection and the victims are con-

stantly menaced by the entrance of septic material into the open doors of the Eustachian tubes. Indeed, adenoid patients actually do have "running ears" in far larger proportion. It is obvious that all adenoid patients should undergo operation but especially is this true in one who has had even a single attack of middle-ear suppuration.

Ear complications of grippe can generally be prevented by careful treatment of the nose and nasopharynx at the very commencement, and, during its entire course, cleaning and detergent sprays, in fact, any treatment which tends to render these tissues clean and free from secretions, may be resorted to. Added to this the patient should be cautioned to avoid violent blowing of the nose—a procedure which, no doubt, often effects the introduction of infected material into the middle ear. Ear symptoms of more or less severity always accompany the exanthemata, especially scarlet fever and measles, and suppuration often results.

That much may be done to prevent such suppuration, and that but little is actually done by practitioners seems to be a fair criticism. During a recent season when measles were prevalent the writer took pains to learn how much even our best and most skillful physicians attempted in the way of prevention of middle ear suppuration. These observations led to a belief that during the early stages of the exanthemata rarely any attempt is made to cleanse the nose or nasopharynx of surplus septic secretion. These patients should receive the very same care as that already recommended for grip. Almost any detergent non-irritating alkaline spray will serve the purpose. A tablet made up of sodium salicylate, sodium bicarbonate, boric acid (aa gr. iijss), oil gaultheria, q.s., dissolved in one ounce of sterile water, has been found to be almost without irritating qualities. This tablet was devised and first used at the Manhattan Eye and Ear Hospital and in that institution is called the Manhattan tablet. Free purgation, preferably by means of calomel, is a most helpful clinical adjunct, especially when administered at the very commencement.

For the relief of the excruciating pain during the time previous to the establishment of the discharge, not much can be accomplished, aside from the use of heat and narcotics.

If examination of the drum shows clearly that no pus has yet formed, the canal should be irrigated with large quantities of hot sterile water at half hour intervals. A large douche bag hung high enough to give sufficient force to the stream is probably the best method for hot water irrigation. The temperature of the water may be from 100° to 110° F. Added to this should be the internal administration of some form of narcotic which will be far less harmful to the patient than the prolonged excruciating pain. Such remedies as hot oil and laudanum, the heart of an onion and a long list of similar ones are only mentioned to be condemned for obvious reasons. If the discharge has not actually commenced and the tympanic membrane is bulging or otherwise giving evidence of the presence of pus in the cavity, a free incision should be made. It requires some experience to make this incision properly, but incision is preferable to puncture. Such incision should be made under strictly aseptic surroundings and it should be carried not only through the membrane proper but upward through the attic region and well out on the wall of the canal. This serves to open freely both the tympanum and attic, and also to bring about a free flow of blood, thus greatly relieving the congestion. Many serious results may be avoided by resort to early incision.

Treatment during the attack.—After the discharge is established it is necessary to decide upon the course of treatment to be followed and in so doing we should not forget that the chief requirements are cleanliness and free drainage—and cleanliness should refer to the nose and naso-pharynx as well as to the external ear and auditory canal. Time will not permit even a narration of various plans suggested in the books and writings of otologists. Frequent irrigation with a one to 4,000 sterile solution of bichloride of mercury, thoroughly cleansing the canal of all discharge, using one to two quarts at each treatment is perhaps the easiest and best method. This should be done every two hours. With young children it is necessary to use some force for the first few treatments, but after a little they submit with good grace. For the past few months in the outdoor clinic of the Manhattan Eye and Ear Hospital I have been using formaldehyde solution in the same manner. Very careful instructions should be given

to the mother or nurse as to doing this work thoroughly, and at each daily visit the attending physician should give a complete treatment himself, wiping out all surplus secretions with a cotton probe and making a careful examination of the condition of the drum and the canal by means of reflected light. This procedure is necessary both for the benefit of the patient and also that the mother or nurse should see exactly how the work should be done. At each visit pressure should be made over the mastoid, especially over the antrum and tip, and the patient questioned, to discover if there be pain in this region. A small quantity of sterile gauze should be packed loosely in the outer part of the canal and changed as frequently as it becomes soaked with pus.

It should be the routine procedure in both private and hospital practice to make microscopic examinations of the pus in all acute cases of middle-ear suppuration. Such examination should be made as soon as possible after the establishment of the discharge. The predominance of certain organisms, especially those accompanying grip and the exanthemata, becomes of importance when complications arise. It has been fully demonstrated that when the more virulent organisms predominate serious complications are more liable to arise. When mastoid involvement occurs during the course of middle-ear suppuration one's judgment is usually subjected to a severe test. The very early symptoms may be, and sometimes are, relieved by measures other than external operation. Free incision of the drum membrane as heretofore indicated may be sufficient. In fact the whole theory of such relief is based upon the importance of free drainage. So that when the antrum itself is involved, the danger of further involvement of the mastoid cells may be avoided by establishing such drainage. This, together with local blood-letting by means of real or artificial leeches and the application of either the ice coil or, as some prefer, hot poultices and the hot douche, about exhausts the list of abortive measures. Aside from the ice coil and the establishment of free drainage in the canal, the benefits to be derived are at least meager. The great tendency is to make use of preventive measures for too long a time. The ice coil should not be used longer than 24 or 36 hours, after which

time it may become a dangerous application on account of its proneness to mask the symptoms. Continued use of poultices is equally bad. In fact, any prolonged attempts to abort mastoid suppuration are to be deprecated. The patient, of course, should be confined to bed and should remain there until all mastoid symptoms have passed away.

While opinions may vary to a marked degree from operating at the very commencement of mastoid involvement to a delay which may lead to extensive complications, there certainly must be a period when operation should no longer be delayed. Prolonged tenderness upon pressure in the region of the antrum together with the bulging of the atticus tympanicus and the superior posterior wall of the canal constitutes sufficient reason for operative procedure, and especially so when the pus contains the more virulent micro-organisms. In other words external operation should be performed in acute suppuration of the mastoid cells when a permanent remission of symptoms has not been brought about by free drainage through the drum membrane, or by such local applications as have heretofore been described, and when this time has arrived there should be no delay. The majority of hospital cases and many of the private ones have already reached this stage before they come under the care of the otologist. Just when the exact time arrives may not be measured by days or hours. The date must be determined by the good judgment of those who have the patient in charge.

Many delays in operating come either from lack of willingness to consent upon the part of the patient, or his family, or from the extreme conservatism of the family physician. Conservatism is a quality not to be ignored, but when carried to the extreme it reacts to the great detriment of the patient. The same statement may be equally true when applied to radicalism. Indeed, it is quite possible for the conservative to be radical in his conservatism, and of the two it would seem to be preferable that one should be conservative in his radicalism rather than radical in his conservatism.

Another strong point in favor of early operation is the better results to be thus obtained. Early operation usually will be followed by practically perfect hearing on the affected

side. It must not be forgotten that pus pent up in the mastoid cells is in a position to seriously menace near-by vital structures. Not more important is it to remove the suppurating mastoid cells.

General treatment.—A very careful examination of the general physical condition of the patient should be made and the facts relating to his habits, digestive and eliminative functions should be ascertained and set right. The general or internal treatment may often be commenced during the suppurative period, so soon as the temperature becomes normal. The internal treatment should be just whatever the general condition of the patient seems to require. Iron, cod-liver oil, strychnine, iodide of potash, creosote and hypophosphites may be mentioned as most helpful medicaments. Freshly made syr. ferri iodide is mostly used in our large ear clinics. These tonics are to be given not only because of the general condition of the patient requires such treatment, but because such improvement in turn brings to bear a most helpful influence upon the suppurative process.

Conclusions.—(1) In acute middle-ear suppuration early and free drainage is of the utmost importance; (2) patients should remain in bed until acute symptoms have passed; (3) free purgation (preferably by means of calomel) should be resorted to; (4) microscopic examination of pus should be made; (5) local treatment should consist of cleanliness and free drainage; (6) proper internal medication should not be avoided; (7) prolonged attempts to abort suppuration of the mastoid cells are to be condemned; (8) early operative interference in mastoid suppuration prevents the more serious complications and gives far better hearing results; (9) uncomplicated cases of acute suppuration of the middle ear, when properly treated always recover in from two days to three weeks; (10) the responsibility for preventive treatment must be largely assumed by the family practitioner. He should fully appreciate the importance of preventive treatment when caring for grippe, the exanthemata, or other infectious intra-nasal conditions, and also, the early and complete removal of diseased adenoid tissue.

XIV.

THE ETIOLOGY, PATHOLOGY AND SYMPTOMATOLOGY OF CHRONIC PURULENT OTITIS MEDIA.*

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The serious complications which appear during the course of chronic purulent disease of the middle ear, emphasize the importance of treating this affection with earnest consideration.

Chronic otorrhea is more prevalent than the general practitioner is apt to believe from personal experience. When we learn through a recent report† of an examination of school children, carried out by Arthur Cheate, in London, that out of 1,000 children, 335 had discharge from one or both ears, the frequency of this condition is rather astounding.

Etiology.—In the majority of cases this disease follows an acute infection of the middle ear which has been neglected or improperly treated. Syphilitic and tubercular manifestations are the exceptions to this rule. The latter changes may progress insidiously without much local discomfort except for the loss of hearing and the presence of a purulent discharge. The previous history and a bacteriologic examination will assist in excluding these systemic infections. Scarlet fever, measles and diphtheria are potent factors in causing middle-ear disease in early life, while influenza has in recent years been followed by severe and prolonged aural complications.

*Read before the New York County Medical Society, Sept. 22, 1902. Fourth paper of Symposium.

†Journal of Laryngology, June, 1902.

Though much has been said and written upon the influence of nasal and post-nasal disease in aural disturbances, I cannot pass by this portion of the subject without mentioning the fact that my present experience certainly corroborates the observations recorded in my paper upon "Adenoids: A Contributive Factor in Aural Affections," which was read before the Pan-American Medical Congress in 1893.

We should examine the pharyngeal space in all ear cases, be they catarrhal or purulent inflammations, and we will often find the cause of a persistent discharge and other annoying symptoms. It is not uncommon to see marked improvement in such cases after the removal of a hypertrophied pharyngeal tonsil. These growths, by their presence, keep up a congestion of the adjacent tissues, and act as an obstruction to the pharyngeal and tympanic circulation. The recesses which exist between the folds of the lymphoid hypertrophy offer a suitable habitation for the generation of infectious bacteria. These find their way through the Eustachian tube and exert their deleterious influence upon the tissues in the middle ear and neighboring cavities.

Pathology.—Micro-organisms of a pathogenic nature are the important element in the production of purulent otitis. All the conditions favorable for their growth and propagation are found in the tympanic cavity, but we seldom obtain a pure culture of a germ from this chamber. The infection is almost always of the mixed variety, though the *Staphylococcus pyogenes* is probably the most constant. With the invasion of streptococci and pneumococci the inflammation assumes a more virulent aspect, and dangerous complications are liable to follow. The continued presence of either of the latter microbes lends additional weight to the importance of hastening surgical intervention in doubtful cases.

Moos has found that during catarrhal exacerbations the mucous membrane of the pharynx and the middle ear becomes infiltrated with innumerable polymorphous cells, causing the membrane to become hyperplastic. There is no tendency to purulent disease under such conditions, unless a change occurs in the nourishment of these tissues. If the resistive power weakens, the micro-organisms rapidly increase in number, and infection results. The smaller the number

of microbes, the less liability there is to pus formation. In children, the invasion enters through the Eustachian tube very early, as this channel is wide and short. In eruptive diseases, the circulatory and lymph vessels are apt to carry the infection. Hematogenous changes are inclined to become chronic in character, as the healing of the parts is more complicated.

In prolonged suppuration, the microscope shows that the drum and mucous membrane of the middle ear are hyperemic and hypertrophied, with round celled infiltration.

Schwartz states that this overgrowth invades the pneumatic spaces, and also imbeds the ossicles as it advances. In some places the epithelial layer of the membrane is thrown off and ulcerations exist. Owing to these changes, synechia form, and the ossicles, together with the tendons of the tensor tympani and stapedius muscles, become bound down.

If the inflammation continues granulations and polypi appear, and the periosteum becomes involved; the ossicles and bony walls are attacked by the round celled infiltration, and necrosis results, with dislocation of the bonelets and exfoliation of the adjacent bone. In this manner the attic, aditus and mastoid cells become affected. Fistulae through the tegmen tympani are formed and infection spreads to the dura and cranial cavities. Cerebral complications are consequently most frequently associated with chronic purulent disease.

If the path of infection extends through the posterior wall of the mastoid, sinus involvement and cerebellar abscess may result.

In some skulls the bony capsule of the jugular bulb stands out prominently along the floor of the middle ear, and may become diseased early in the course of a severe infection, causing a septic thrombus in this portion of the venous circulation.

In persistent purulent otitis, we find a loss of a portion of the drum membrane. At times, the entire membrane has been absorbed, and the remains of the ossicles may be seen hanging in the middle ear. When the secretion is small in quantity, it may form a crust over a small perforation, and the latter may be overlooked in a cursory examination. The

position of the perforation assists in locating the disease. If the opening in the drum is situated in Shrapnell's membrane it usually signifies necrosis of the ossicles or involvement of the attic. As the incus is scantily supplied with blood vessels, it is the first of the ossicular chain to become diseased. It is only in long-standing cases that the posterior wall of the middle ear becomes affected, except in tubercular or other severe infectious inflammations. The folds of mucous membrane which line the upper portion of the tampanum become hypertrophied and so retard drainage, thus exposing the adjacent cavities to the infectious secretion. In this manner the mastoid becomes involved in acute manifestations, and we must bear in mind this anatomic feature, as these reduplications of membrane must be attacked when drainage is obstructed, consequently the bulging drum must be incised high up and deep, when mastoid symptoms exist.

Symptomatology.—Loss of hearing, with an intermittent or persistent discharge, are the most frequent symptoms of this chronic affection. A weeping eczema of the canal may give rise to moisture, without the existence of middle-ear trouble. If, however, the purulent discharge from the ear is acrid, the skin becomes macerated and a dermatitis results. Frequently the canal is secondarily infected, and a furunculosis develops. Such a lesion may so obscure our vision that the inner portion of the canal cannot be seen, and it is impossible to determine at the first examination whether the middle-ear suppuration is the exciting factor. The character of the discharge will at times indicate the presence of bone necrosis, especially if the secretion is greenish or foul-smelling. A bloody discoloration suggests the presence of granulation tissue or polypi, while a distinct blue tint is due to the *Bacillus pyocyaneus*, and also indicates bone disease. When the discharge is profuse and reappears immediately after our attempts to clean the canal, we should suspect a reservoir of pus in the mastoid process, or neighboring cavities, and must not hesitate to employ surgical measures. The quantity of the discharge is augmented by catarrhal changes, current diseases and trauma. A seemingly trivial otitis may suddenly assume an alarming aspect, and even terminate fatally in a rapid manner.

To illustrate the preceding statement I briefly mention the case of a young man, twenty years of age, who came under my care a year ago. His right ear had been discharging off and on for 10 years without much annoyance, except for some loss of hearing on that side and a slight amount of secretion. A week before I saw him he was struck over the ear by the fist of one of his companions. The same day, pain set in, and the discharge became profuse and bloody. A few days later, there was an offensive odor to the secretion and the pain radiated over the right side of the head. His temperature rose to 103° F., and chilly sensations appeared. Pressure over the mastoid and its tip revealed tenderness. The patient presented a distinctly septic picture, so the mastoid was opened and found extensively diseased, together with thrombosis of the lateral sinus and internal jugular vein. The latter was ligated near the clavicle, and the sinus thoroughly curetted. Reinfection of the posterior portion of the sinus occurred, and two subsequent operations were performed in two weeks, and the sinus was found diseased toward the torcular. Fortunately the patient recovered, but the history of his case shows that a chronic suppuration may exist for 10 years without causing much inconvenience to the individual, until an exciting factor reawakens the slumbering sepsis to renewed activity. Pain is not a characteristic symptom in chronic cases, except during an exacerbation. It is then suggestive of further extension, and should be carefully considered.

It is not unusual to find marked destruction of the mastoid in this phase of the disease without distinct premonitory symptoms. Invasion of this process has followed the removal of diseased tissue from the middle ear due to disturbing nature's protecting zone of granulations. These accidents demonstrate the importance of careful asepsis in seemingly minor aural operations.

If during a purulent otitis, the patient experiences a chill or chilly sensations, with a sudden rise of temperature, we must at once suspect an extension of the infectious process, and think of the presence of pyemia, sinus thrombosis, meningitis and cerebral complications.

The dangers that lurk in a chronic discharging ear, cannot be too strongly impressed upon the public at large. Professor William Macewen has tersely remarked, "We cannot too often recall the warning that the virulence of an otorrhea cannot be measured by the quantity of the secretion, its odor, or the slowness of its initial symptoms, and that the pyogenic process may proceed insidiously until some accidental circumstance precipitates a dangerous or fatal crisis."

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XV.

COMPLICATIONS OF CHRONIC SUPPURATION OF
THE MIDDLE - EAR*.

BY ROBERT LEWIS, JR., M. D.

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In the brief ten minutes allotted for the presentation of this division of the topic under discussion it will be possible to speak only of those phases of the subject which deal with the etiology of the complications of chronic purulent otitis media, and of the frequency and serious nature of these complications.

Dr. Clarence J. Blake, of Boston, in a paper on "Otology and General Medicine," speaks of Prof. Politzer as holding up, in the course of one of his lectures, a temporal bone by the styloid process, and, while turning it slowly around before his class, making the following statement: "Gentlemen, the temporal bone has four sides; the outside is bounded by life, from which there comes, through the opening of the external auditory canal, one form of our appreciation of what life means; on the other three sides this bone is bounded by death."

That this metaphorical but forcible description is practically true is readily comprehended when the number and importance of the anatomic parts which may be involved and the serious pathological processes which may develop as complications of an acute or chronic purulent otitis media

*Read at the meeting of the Medical Society of the County of New York, Sept. 22, 1902. Fifth paper of Symposium.

are taken into consideration. It is my province to speak only of the complications of chronic purulent otitis media. What are these complications?

First, we have those which relate to the parts primarily involved, and among these may be mentioned the following pathologic lesions: The membrana tympani is wholly or in part destroyed; a portion of, or all of, the mucous membrane lining the tympanum has lost all of its characteristics, and in its place are to be found granulation tissue and polypi; similar changes are observed in many cases in the adjacent related cavities; one or more of the ossicles are carious or they may have been totally destroyed; or there may be a necrosis of tympanic walls. In a second group may be placed those complications which involve still other auditory structures, as, for example, a necrosis of the petrous portion of the temporal bone, with destruction of the auditory nerve; a cholesteatomatous mass in the mastoid antrum; or a mastoiditis of such portions of the mastoid process as may have escaped eburnification.

As a result of these pathologic changes there is an impairment or loss of the important function of hearing.

In the third and last group belong those complications which involve other organs than those of audition. Thus, for example, one of the sinuses at the base of the brain may become involved in a septic inflammation, with the formation of a septic thrombus; the internal jugular vein and, in rare cases, the carotid artery may also be involved in a similar inflammation.

The dura mater may be the seat of a general or a localized pachymeningitis or extra-dural abscess; the pia mater and arachnoid may also be involved, *i. e.*, there may be a leptomeningitis; or the septic infection may invade the cerebral structures, giving rise to the formation of an abscess cavity in the substance of the brain. A facial paralysis may occur as a result of an erosion of the Fallopian canal.

The respiratory organs may be infected and there may be a septic pneumonia or a septic pleurisy. A metastatic abscess may develop in the liver or the spleen, or in some other part of the body.

A septic synovitis may involve one or more joints. A gastro-enteritis may occur as the result of the infected material passing down the Eustachian tube into the pharynx and then being swallowed. Or, finally, a general pyemic condition may be established.

It is remarkable, not that so many cases of intracranial and other complications arise in the course of a chronic purulent inflammation of the middle ear, but that many more cases do not occur; for upon reflection it must be admitted that almost ideal conditions exist in and near the middle ear for the propagation of pathogenic germs, and for their penetration into neighboring regions. It is also a fact that this invasion of neighboring regions is still further promoted by gross negligence on the part of the laity, and, to a certain extent, by the failure of medical men to realize the dangerous nature of this class of cases. Fortunately, the latter statement is growing day by day less true.

We find, in considering these points more in detail, that, in the first place, the disease is seated in a small cavity (the tympanic cavity) and that, in many cases, it involves secondarily the smaller adjacent cavities of the mastoid antrum and the mastoid cells, *i. e.*, cavities which are full of little niches and pockets, which are dark and of a uniform temperature, and which are lined with a mucous membrane that has become diseased and is secreting an abnormal amount of acrid fluid. In fact, we have here an ideal incubating chamber and medium for the generation of germ life. Micro-organisms (both saprophytic and pathogenic) are to be found in many varieties and in swarming colonies in all cases of chronic purulent otitis media. The pathogenic varieties most often observed are the streptococci (the most virulent of them all), the staphylococci and the pneumococci; while tubercle bacilli, the *Bacillus intracellularis*, Friedlander's bacillus, the typhoid bacillus, the bacillus of diphtheria and the *Bacillus coli communis* are also at times found upon bacterial examination of the purulent exudate obtained from this focus of disease.

With the probable exception of those cases which are due to tuberculous or syphilitic disease, all cases of chronic

purulent otitis media result from a neglected acute otitis media. The inflammation, as it becomes chronic, changes the character of the mucous membrane in such a manner that in time the connective-tissue element largely predominates and the formation of granulation tissue with polypi is the result. Owing in part to the diminished blood supply and in part to the action of the bacteria, a necrosis of the ossicles and of the bony walls of the tympanum is started. These lesions extend until other cavities and structures are involved in the same destructive process.

There are many paths along which infection may travel from the original seat of the disease to most important and vital parts. The bacterial invasion may reach the meninges or deeper brain structures by way of the vascular system; thrombi may form in the small veins which pass from the tympanum and its contiguous structures into the neighboring sinus, and through the infection of the latter the veins which lead into it from the cerebral tissues may similarly become infected; or a thrombus may form in some small vessel, disintegrate, and be carried (because of a reversal of the blood current owing to occlusion of the vein and also in a measure to the lack of valves in the veins of this region) into the cerebral tissues; the bacteria may advance along the perivascular sheaths of the arteries and thus give rise—although such an occurrence is rare—to septic thrombi in the arteries themselves.

The lymphatics afford another pathway along which infection may travel to other structures. In rare cases the infection may extend from the middle ear, through the horizontal semi-circular canal of the vestibule, into the labyrinth, and thence by way of the internal auditory meatus to the meninges. Again, infection may be the result of direct contact made possible by the destruction of, or because of a dehiscence in the bony partition separating the cerebral from the middle-ear cavities. Another means of infection was well illustrated in a case which was under my care during the past spring. In this case a sinus led from the antrum to the cortex of the mastoid process, where a very large subperiosteal abscess formed. The upper limit of this abscess ex-

tended as high up as a point a short distance above the parietal eminence. A little below this eminence the bone was necrotic, and that the necrosis had extended from without inward was made evident, when the necrotic bone was removed, by the extent of the necrosis externally and its limited area on the inner table. At this point there was an extra-dural abscess, connected by a fistulous tract with a cerebral abscess; the extra-dural abscess did not extend downward farther than within three-quarters of an inch of the floor of the middle cerebral fossa—a further evidence that the infection was not conveyed through the tympanic roof. In this case, therefore, it is reasonably clear that the infection chose a most roundabout path.

A disintegration of a thrombus may occur and particles of it loaded with bacteria may pass into the general circulation, to give rise to a metastatic abscess, a septic pneumonia, or a septic pleurisy; or, as I have before stated, pus may pass through the Eustachian tube into the pharynx, to be swallowed and give rise to a gastro-enteritis.

That these complications are not rare, statistics easily prove. In this country about 4,000 cases of brain abscess of otitic origin, or about one in every 19,000 of population, annually die, while, according to Koerner, the Prussian statistics for 1885 give a death-rate for otitic brain abscess in that country about three times as great as that given above for the United States, or about three for each 20,000 of population. Whether the number for this country is lower because of the higher general intelligence of the people, which causes them to be less neglectful of a disease of the ear, or because of better hygienic and other conditions (favoring as they must a small number of cases with aural disease), or whether the number may not perhaps seem to be less because of the less exhaustive character of our statistics, are questions which at present I am unable to answer.

According to Pitt the number of brain abscesses which occur from otitic disease amount to 30 per cent. of the whole number. Barr estimates it as high as 50 per cent. of the whole number of abscesses of various origin. Pitt estimates

that five per cent. of all cases of sinus-phlebitis are of otitic origin. In 17,028 autopsies in London death was due in 102, or one in 167, to an otitic lesion.

In 10,707 cases with tympanic suppuration 69 deaths, or one in 155, occurred as the result of some aural lesion (Koerner). In 38,017 aural patients death occurred as a result of the disease in 119, or one in 319 (Buerkner's and Randall's individual statistics added together). As to other lesions, such as general pyemia, pneumonia, etc., I have been unable to obtain any statistics.

Of all the intra-cranial complications pachymeningitis is the most common. Under this designation are included also those cases of so-called extra-dural abscess, which is a limited pachymeningitis walled off by adhesions from the rest of the brain surface. In the same category are also placed those cases which are known as perisinus abscesses, a condition which is in fact a pachymeningitis limited to the site of the sinus.

According to Jansen, pachymeningitis is four times as common as sinus-phlebitis, and 20 times as common as brain abscess. When either of these latter lesions occurs pachymeningitis is generally to be found associated with either or both of them, and especially is this the case with regard to sinus-thrombosis.

Leptomeningitis is an affection of the arachnoid and pia mater in which the infective material is carried along the minute blood vessels that lead from the brain. These cases are very fatal. Cases of serous meningitis of otitic origin, which, as I believe, occur more often than we have hitherto supposed, if recognized early and operated upon in such a manner as to secure good drainage, stand a very fair chance of recovery.

In brain abscess the cavity is connected in 92 per cent. of the cases with the suppurating ear by a fistulous track. In 95 per cent. of the cases there are multiple abscesses. In 6.6 per cent. of the cases the abscess lies within the brain and is separated from the source of the disease by normal

brain tissue. The majority of these abscesses are to be found in the cerebrum, and of these the larger proportion are to be found in the inferior and posterior portion of the temporo-sphenoidal lobe. The next most common site is in the anterior and lateral portion of the cerebellum, behind the petrous portion of the temporal bone. Other portions of the temporo-sphenoidal lobe and also of the frontal lobes are often found to be involved, and in a few cases the occipital lobe has been the seat of the abscess.

Next to pachymeningitis, sinus-phlebitis and thrombosis occur the most often of all intracranial complications. The sigmoid sinus is the one most frequently involved and is generally accompanied by a perisinus abscess. By extension of the disease the internal jugular is very often involved, and the occurrence of general pyemia and other septic conditions elsewhere is frequent. When the superior petrosal sinus is involved a necrosis of the posterior and superior portion of the petrous portion of the temporal bone is likely to be the consequence. When the inferior petrosal sinus alone is involved it is the result of a necrosis of the apex of the pyramid or it is due to a purulent inflammation of the labyrinth. The cavernous sinus is seldom involved. In 82 per cent. of the cases the bone necrosis extends through the inner table of the mastoid process and is in direct contact with the sinus wall.

To prevent the development of these most serious complications the medical adviser must urge the necessity of dealing with every case of chronic purulent otitis media as something not to be lightly regarded, but as a disease which must be eradicated, no matter how innocent a case it apparently may be.

The disease is capable of advancing most insidiously and often without any symptoms until a very extensive destruction, not alone of the tympanic cavity and its adnexa, but of the brain tissues as well, has taken place. Brain abscesses have often been found at the autopsy to have been the cause of death when no such lesion was suspected in life. How many more cases of this and other pyemic complica-

tions of otitic disease die annually in which death is attributed to the complicating pyemic metastasis, or to apoplexy, or to heart disease, may only be suspected.

In the words of MacEwen, "One who has a chronic purulent otitis media is liable to have, with very little warning, a most serious or even a fatal illness."

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XVI.

THE TREATMENT OF CHRONIC SUPPURATION
OF THE MIDDLE EAR*

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The time allowed me admits of but crude handling of such a large subject, and I shall be able to touch only briefly upon some of the main points, with a reference to or mention of other more important operative measures for the relief of this disease.

At the outset, it is well to understand what is meant by the term "Chronic Suppuration" when applied to the ear.

The writer would define this as an inflammation of the structures which form the middle ear, that lasts for a period of six months or more, with or without treatment.

There are many methods advised at the present day in the treatment of this disease, but clinically we shall consider only two, the dry, and the irrigation or wet treatment.

In treating this disease we should have three objects in view; first, the cure of the otorrhea; second, the improvement of the hearing; and third, the relief of the subjective sounds, when present.

At the beginning of treatment a careful examination of of the nose and naso-pharynx should be made and, should obstructions exist in one or both localities, they should be removed, as in children and young adults a very common cause of middle-ear suppuration is the presence of adenoid tissue in the pharyngeal vault.

At the outset, the first cardinal principle is to secure and maintain cleanliness of the auditory canal and the parts adjacent. After this has been accomplished, the next import-

ant point is to determine just what structures of the middle ear are involved, as this will have a decided bearing upon the prognosis of the case. We should determine the location of the opening in the drum membrane, and whether the present opening is draining the cavity behind it sufficiently, and if not, this opening should be enlarged, so as to promote drainage. Usually the higher the perforation in the drum, the greater the involvement of the structure beyond, and the less tendency to a kindly healing. We should ascertain at the first examination, and before treatment is begun, if any caries of the ossicles or adjacent structures exists, and this can easily be made clear by cocainizing the point of the perforation, and using the silver probe to palpate with, but the mistake should not be made of calling every particle of exposed bone "dead bone."

The dry treatment is carried out in the following way: The hands of the person who is to treat the case are first made sterile; sterilized cotton is used on a carrier to thoroughly wipe the canal dry. After this drying process, a fine powder is insufflated over the drum surface as well as the canal walls; the powder used varies with the person treating the case: xeroform, nosophen, boric acid, acetanilid, aristol and iodol have all been used with good results; after this, a small wick of gauze iodoform, borated, or plain sterilized, is passed up and, if possible, into the perforation, and the canal is loosely filled to the meatus.

If the opening in the drum be too small to admit the end of the gauze wick, then the canal is loosely packed from the drum to the meatus, and the gauze thus acts as a siphon to carry away the discharge. As soon as the gauze becomes thoroughly moistened with the discharge, it should be removed and the process of cleansing the canal carried on as before. The chief objection to this method of treatment is the absence of a trained nurse to carry it out on antiseptic lines; if this could be arranged for it might in the future become the ideal way of treating this disease; but when such treatment is left to the patient or to some member of his family, who knows practically nothing of what the word "sterile" means, it would seem that the disease might be prolonged to an indefinite period, owing to reinfection constantly

taking place; and to put such a method of treatment in the hands of a hospital or clinic patient would seem to the writer a prolific cause in maintaining the disease.

The irrigation or wet treatment is the one ordinarily used to-day among the majority of aurists, and consists in syringing the ear with one of the following solutions: Bichloride of mercury in the strength of one to 4,000 to one in 8,000 of sterile water; a solution of boric acid of the strength of 20 grains to the ounce of boiled water; a solution of carbolic acid ranging in strength from one to two per cent.; a weak solution of formalin and a solution of potassium permanganate; a normal saline solution or warm sterilized water is all that is necessary in many cases; indeed, I believe we could dispense with all others except the warm saline solution, did we but try. When the patient is seen by the surgeon, and after the parts are cleansed in the manner described, a good solution to further sterilize the parts is one composed of equal parts of the solution of bichloride of mercury one to 1,000 and absolute alcohol; to this can be added boric acid from 10 to 20 grains to the fluid ounce. If granulations be present they can be destroyed by chemical agents; the one most commonly used in the ear to-day is a solution of silver nitrate ranging in strength as high as 360 grains to the ounce. Chromic acid is also used.

Before using either of these agents, the parts to be cauterized should be cocainized, thus avoiding pain for our patient. If polypi are present, they can be saturated with a solution of cocaine or eucaine and adrenalin and be removed by the use of the curette or snare; and after their removal the base should be cauterized. In some of the cases where polypi exist, especially in our young patients, it is best to administer an anesthetic, in order to obtain a complete removal. After the canal has been cleared in this way and also in the ordinary cases of otorrhea we direct the patient, or whoever is to care for him, to irrigate the ear with a solution of bichloride of mercury one to 5,000 every two, three or four hours, as the case may be, depending upon the profuseness of the discharge. As soon as the discharge begins to diminish, then the frequency of irrigation should be lessened, as it is well to bear in mind that too frequent syringing of the ear lessens the integrity of

the tissues and serves to soften and make the parts flabby, thus preventing resolution from taking place. After we have cleansed the canal and just prior to stimulating the part, we should direct the patient to perform Valsalva's method of inflation, as this tends to expel from the middle ear, through the opening in the drum, any retained secretion. Should the patient be unable to do this, then gentle inflation, by means of the catheter, should be performed, and the secretion thus displaced should be removed before our final application is made to the surface we wish to stimulate.

After the discharge becomes less abundant and the patient is seen less frequently, a solution to be used at home can be prescribed, composed of the ingredients mentioned in a former paragraph, namely, boric acid dissolved in equal parts of alcohol and a one to 1,000 solution of bichloride of mercury. The patient is instructed to place from five to eight drops of this solution in the ear, morning and evening, after the cavity has been cleansed. This acts as a stimulant, and hastens the healing process. Later, as healing progresses, it should be used less frequently and finally dispensed with, when a firm cicatrix is formed. When the discharge is diminishing and after it has ceased, we can hasten resolution and improve the hearing by inflation and vaporizing the middle ear every other day, and later, once or twice a week; by this mode of treatment, the adhesions already formed are stretched, and the new drum surface is saved from any marked degree of contraction.

In cases where the perforation in the drum is on a level or higher than the short process of the malleus, we find a small amount of thin serous secretion, and if this persists in spite of all treatment, we can, in a large number of cases, bring about a speedy cure by the thorough cleansing of the middle ear by the use of the middle ear syringe, first injecting our sterilizing solution through the perforation until we are sure the cavity is clean, and then injecting an astringent solution sufficient to completely fill the tympanic cavity. The astringent most in use here is silver nitrate; and at first it should not be used stronger than five grains to the ounce; a solution of eucaine or cocaine can be injected into the cavity before the silver solution is used, and this will render it

much more comfortable for the patient. Stronger solutions can be used later should they be required. Zinc chloride has been used in this way, and also a two per cent. solution of protargol has been followed by rapid cures, the stimulating qualities seeming to act beneficially without the irritating properties of some of the other astringents.

As to the use of hydrogen peroxide in the treatment of this disease, there is a wide diversity of opinion. Some authorities report most brilliant results from its use; the claim is that when so used it clears out the small cavities by displacing secretion, which otherwise would not appear without the use of this agent. That this claim is well founded there can be no gainsaying; but I should hesitate to use this agent in the ear when the opening in the drum membrane is small, as the force exerted by the fluid might easily displace retained secretion, and carry it backward through the auditus into the mastoid antrum, and thus infect this structure. Were the perforation in the drum a large one, then I should not hesitate to use this agent, but a better and more stable one would be hydrozone. Enzymol in a 50 per cent. solution has received high praise as an adjunct in treating this disease. I have tried it in a number of cases, but with little or no improvement.

When the discharge is very persistent, and we have an area of exposed bone complicating the simpler condition, I have found the use of carbolic acid of very great value. The head is placed in a horizontal position and the canal partially filled with pure carbolic acid, and allowed to remain about 30 seconds, when the canal is syringed with pure alcohol. In this way the alcohol counteracts any escharotic action which the acid would have upon the normal tissues, and yet at the same time the diseased parts are thoroughly cleansed and stimulated. This procedure causes but little pain, as the patient experiences only a slight stinging sensation which quickly disappears. When after all the ordinary methods of treatment, a small perforation exists, with little or no moisture and the parts upon inspection look indolent, the method suggested and practiced by Blake, of fitting a very thin piece of sterile paper over the existing opening, will oftentimes heal the perforation. Flexible collodion applied over the

perforation will also bring about healing in a short time.

To improve the existing tinnitus after the otorrhea has ceased, we employ inflation and vaporization of tube and middle ear, and also administer strychnin in tonic doses, as well as small doses of the iodide of potassium. When we find upon examination intra-tympanic caries, no time should be lost in its removal, and if there has been no previous involvement of the mastoid structure, this removal can be accomplished through the external auditory canal. If, however, the mastoid shows signs of a previous involvement, or the amount of caries is so extensive as to preclude its complete removal through the canal, then a posterior opening should be made, and the radical operation performed, so as to throw the mastoid antrum, the cavity of the middle ear and the canal all into one. After this has been done, the application of a skin graft, taken from the thigh of the patient, and placed on the exposed area of the middle ear after the manner described by Ballance, will promote healing and give a rapid and permanent result. In cases of long standing suppuration with extensive caries within the tympanum, it is unwise to attempt removal through the canal, for in a small proportion of these cases, perforation has already taken place through the tegmen, and the irritation set up at this point by the manipulations within the ear will often cause disastrous results by a future extension through this opening.

Also in cases of long-standing suppuration, when the discharge has suddenly ceased, and the patient complains of an uneasy sensation about the head with pain, and accompanied with a slight rise of temperature, we should lose no time in promoting free drainage from the middle ear, and even, if necessary, open the mastoid; and many of these cases if so treated will show marked destruction of the osseous structure.

During the course of a chronic suppuration, the mastoid is liable at all times to infection, and should it become affected its opening is imperative at once in order that the deeper intra-cranial structures may not become involved. Should an involvement, such as an epidural abscess, thrombosis of any of the sinuses, or a subdural collection of pus take place, they should be treated at once on general surgical principles,

and all pus evacuated, and the diseased parts removed.

When facial paralysis has occurred in the course of a suppuration of the middle ear, we should lose no time in removing the pressure or ulceration which has caused it, and after this has been done, the interrupted galvanic current should be applied daily to that course of the nerve affected; massage of the affected muscles will also be of great benefit, and the internal administration of strychnin in full physiologic doses will hasten our cure. When a secondary labyrinthine involvement is present, the internal administration to the patient of pilocarpine muriate will often bring about a happy result. Potassium iodide and strychnine have also been used with markedly beneficial results in this condition.

When the discharge has ceased, in a certain number of cases we find the hearing much worse than while it was present. Upon inspection these cases show destruction of a large portion of the drum membrane, and the ossicles bound down by adhesions. We can often succeed in effecting a decided improvement in audition by dividing these adhesions, a procedure which can be quite easily carried out, after the discharge has ceased. When our suppurative condition is dependent upon, or complicated by syphilis or tuberculosis, the appropriate treatment for these conditions should be carried out aside from the local treatment of the middle ear.

As a word of warning in all cases of chronic suppuration of the middle ear, where necrosis of the bone is found upon our first examination, it is our duty to inform the patient of the danger to life if this condition be allowed to exist without removal of the diseased bone.

One word more and I shall have finished, and that is, in the cases coming under our observation for treatment during the earlier stages of this disease, we should never lose sight of the fact that they need a general and systemic building up in order that the local condition may improve the more rapidly, as it certainly will under properly directed treatment.

62 West Fifty-second Street.

XVII.

THE PREFERABLE ROUTE TO THE ACCESSORY
CAVITIES OF THE NOSE IN THE TREATMENT OF
CHRONIC AND OBSTINATE SUPPURATIONS.*

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THE SEINE, AND

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The sinuses of the face and head (maxillary, frontal and sphenoidal) are grouped about the ethmoid, which is honey-combed with cells, all together forming the ethmoidal labyrinth. Sometimes infection attacks only one of these cavities (maxillary, frontal or sphenoidal sinusitis, or ethmoiditis); sometimes it attacks two simultaneously ((combined sinusitis or polysinusitis); sometimes it invades all the cavities of one or both sides (unilateral or bilateral pansinusitis).

In the pre-rhinologic epoch "only *surgical sinusitis*, which manifested itself externally after penetrating the bony walls, was known, and it was uncommon. At the present time we are able to differentiate rhinologic sinusitis, which reveals itself in slighter symptoms, long attributed to chronic rhinitis; it is frequent." (Lermoyez).

No one doubts that the rhinologic form of sinusitis, discovered and diagnosticated at its appearance, requires only rhinologic treatment, that is to say, through natural openings, surgical measures being reduced to a minimum (catheterization, puncture, curettage). But suppurations tardily diagnosticated or tardily treated, or rebellious to rhinologic treatment are absolutely and will always remain (*surgical sinusitis*).

*From the *Annales des Maladies de l'Oreille, du Larynx, du Nez et du Pharynx*, Feb., 1902.

Rhinologists themselves cannot attack them other than by the ordinary methods of general surgery, that is to say, by entering them through natural passages artificially enlarged, with the aid of procedures derived from the general surgical therapeutics of suppuration in bony cavities (excision and free drainage).

It is exclusively to the study of these obstinate, chronic suppurations of the accessory sinuses of the nose, that this essay will be devoted, its object being a better operative technic. It purposely avoids simple sinusitis or ethmoiditis, either alone or combined, the diagnosis and treatment of which belong to the rhinologic domain, while pansinusitis belongs to rhinology for diagnosis but to general surgery for treatment. A preliminary matter to settle, before seeking the indications to be fulfilled, is to determine as precisely as possible the pathologic anatomy of the lesions to be treated.

Now, autopsies and especially biopsies, which have increased in number with the advance of surgical rhinology, show with regard to persistent suppurations: 1. That the lesions of the sinus mucosa are so deep that they may be considered irremediable. 2. That the ethmoid is always involved, not only with respect to its mucosa, but often also its bony structure, in lesions of sinuses which open into it or near it. 3. That suppuration persists or recurs as long as there remains a septic focus, unrecognized or forgotten, especially if there is insufficient drainage.

The diagnosis of these lesions is now possible, if not always easy, thanks to the progress of rhinology, and in this field the general surgeon should give way to the specialist, reclaiming his rights only at the moment of operative intervention.

Of course, the existence of deformity or *a priori*, a frontal, orbital or maxillary fistula, is, so to speak, pathognomonic; but the diagnosis can and should be made before this far advanced period.

Anterior and posterior rhinoscopy furnish information of great value. The presence of pus in the middle meatus, the channel into which the maxillary sinus, the frontal sinus and the ethmoid cells open, points to infection of these cavities. Modification of the escape, accordingly as the head is held

erect or bent forward, permits differentiation of frontal from maxillary suppuration, the former emptying through an orifice from the lowest portion of the cavity, the latter by an opening so situated that it is lowest only in a particular position. As to ethmoidal osteitis, exploration with the probe will make the diagnosis. The presence of pus in the olfactory cleft, that is to say, between the middle turbinate and the septum, indicates suppuration from the posterior ethmoidal or sphenoidal cells; in these cases posterior rhinoscopy will show pus spread over the vault of the pharynx or the extremities of the superior and middle turbinates.

Exploratory puncture, followed by lavage, is applicable especially to the maxillary sinus, and sometimes the sphenoidal sinus.

Transillumination of the face—determining the permeability to light of the bony walls of the frontal and maxillary sinuses—shows opacity of the sinus involved.

From an exact knowledge of the lesions to be treated come the surgical indications to be fulfilled. It is indispensable :

1. To destroy the affected mucosa.
2. To curette away all bone involved.
3. To drain freely.

The reading of numerous clinical reports, most of which are collected in the thesis of Guisez, shows the importance of these indications.

All rhinologists who have operated upon or seen operations upon either sinusitis or ethmoiditis, have been surprised at the ease with which granulations reappear when any extent of diseased mucosa had escaped in the operation, however thorough the latter may have appeared. In the technic of all rhinologic operations for suppuration, curetting the mucosa is rightly considered one of the most important steps.

Excision of all the diseased bone is of still greater importance. Daily experience in general surgery shows this with respect to the large bones; rhinologic practice demonstrates it just as clearly with regard to the ethmoid. Whether this bone is removed bit by bit through the natural channels, by instruments as numerous as they are varied, or resected in masses with a curette introduced through an artificial opening, cure is obtained only (as is shown by the examination of

cases where successive operations were required) when all the involved bone is destroyed. It might almost be said that the duration of treatment is in inverse ratio to the amount of bone excised.

Finally, the importance of free drainage, very free, as free as possible, is capital, and leads all the other surgical indications. In general surgery the great value is well known of resection and drainage in crowded articulations—astragalectomy, for example, in articular infections of the tarsus. In the surgery of obstinate and diffuse suppuration of the accessory nasal sinuses, destruction of the ethmoid, the bond of union between the sinuses, is the end to be attained. We shall see, in discussing operative methods, how rhinologists have endeavored to secure such an excision of the ethmoid, which it is impossible to completely accomplish, but which they have never been able to make as extensive as they desired. Aside from a few circumscribed suppurations, of evident orbital origin, for which a simple orbital operation sufficed, as in several cases of Laurens', it is to be noted that among the numerous cases published, those that have been followed by rapid and permanent cure were those where nasal drainage, effected by excision of the ethmoid, was as free as possible. This is especially true of the upper cavities, the frontal and sphenoidal sinus and the ethmoid. As to the maxillary sinus, the importance of drainage is demonstrated by the fact that since the primitive proceeding of Caldwell-Luc, radical methods of cure of chronic empyema in the antrum of Highmore have given increasing consideration to nasal drainage, and have led to more and more extensive resection of the sinus wall.

It is possible to suppose even, without going too far in the way of deductions, that almost exaggerated drainage openings may, to some extent, make up for insufficiency of "surgical cleansing" of infected accessory cavities, sometimes so difficult to get at in all their recesses.

To sum up, the dominant surgical indications are two—excise the mucosa freely and especially diseased bone; drain the cavity as freely as possible.

In these chronic and obstinate suppurations, then, the ideal operation would be a "big operation." The importance of this is amply justified by the inconveniences and dangers

growing out of the affection it is designed to cure. Chronic pansinusitis poisons the existence of the patient; tenacious, fetid, abundant, finding exit through the nostrils or into the naso-pharynx, the suppuration discommodates and intoxicates the patient; to mental obsession is superadded a species of mild cachexia from slow, progressive intoxication. Besides, on the one hand, the orbit, and, on the other, the endocranium, are menaced by an invasion of the infection. As for orbital complications, of which an interesting review has been made by De Lapersonne in his report to the French Ophthalmologic Society in 1902, the number of known cases represents pretty accurately the proportion of these accidents. But as for intracranial complications, it is certain that in a number of cases the nasal or perinasal origin of the abscess, meningitis or phlebitis has escaped observers during the life of and even after the death of the patients. Further, whatever may be the proportion of these complications, their gravity is such that they justify, as a prophylactic measure, the most daring attempts at radical cure of chronic, obstinate suppuration of the perinasal bony cavities. The best operation would be that which, while exposing least to extension into the dangerous regions (neck and orbit), permitted an attack upon the infected cavities, to drain them freely and leave behind the fewest traces from an esthetic point of view, at the same time assuring a definite result, as good and rapid as possible.

What have been the routes followed by the numerous surgeons and rhinologists who have attacked these chronic diffuse suppurations?

They are very numerous and can be grouped in the following order:

1. NATURAL CHANNELS (NASAL FOSSAE).

It is through the natural orifice, the nasal fossa, that rhinologists at present operate upon the ethmoid. By reason of progress in the technic, now well marked out (Grünwald, Hajek), the ethmoid labyrinth may be freely opened through the nose. Unfortunately, it cannot be totally resected in this way. The most daring operators dread the proximity of the cribriform plate, toward which, by reason of anatomic

conditions, instruments introduced into the nose are persistently directed. Besides, even upon the cadaver, the operation is incomplete; it generally only reaches the anterior cells. Further, copious hemorrhage and frequent insufficiency of cocain anesthesia necessitate leaving some operations unfinished, which have to be repeated upon subjects who, unfortunately, become "because of nervous shock, less and less manageable, in proportion as the sittings are repeated"—(Luc). When success crowns the operator's efforts it is dearly bought. In fifteen cases of diffuse suppuration, Hajek obtained only three complete successes, and two required a year of attention.

The conclusion to be drawn from all this is, that the nasal operation is appropriate only for recent or circumscribed ethmoiditis.

By the nasal way it is possible to reach the maxillary sinus easily, after resection of the inferior turbinate, and open it as freely as necessary. Free drainage has become the indispensable complementary step of the bucco-nasal operation of Caldwell-Luc, and has gradually become more and more free. Perhaps some day it will be substituted for that operation, or rather constitute its only step. The hope is justified after the excellent success recently published by Claoue, of Bordeaux, who, as the chief feature of his method opened the sinus freely by way of the nasal fossa, following his own special technic.

As to the frontal sinus, it is not approachable through its floor, and the attempts made by this route, by Schoeffer and Winckler, have not been imitated.

Lastly, the sphenoidal sinus becomes accessible only after resection of the middle turbinate and sometimes of the ethmoid, and the proximity of the cribriform plate (which is menaced by any instrument introduced into the nose in an ascending direction, even obliquely backward) inspires wholesome fear.

The operation of Rouge, sublabial rhinotomy, which enters the nose through the mouth, by stripping the nasal pyramid upward from the labiogingival groove, is only a variation of the operation by natural routes, and gives a view little better than anterior rhinoscopy.

The same criticisms apply to the operations which strip up a portion of the nasal pyramid by the aid of cutaneous incisions—incision of the cartilage of the nose (Hippocrates), of the naso-buccal groove or the naso-labial groove, without section (Syme) or with section of the cartilage (Castex). The upper portions of the nasal fossae are inaccessible by these procedures, and the cutaneous cicatrix is an inconvenience without compensation by way of advantage. Hence, the natural route, that is to say, the intranasal route, is acceptable only on condition of its being enlarged or combined with another opening.

2. THE MAXILLARY ROUTE.

This is really a natural route, since the antrum of Highmore is entered through its intrabuccal aspect by most rhinologists. Through this path Goris has reached the ethmoidal labyrinth; Bardenheuer the frontal sinus; and Jansen, Luc, and Furet the sphenoidal sinus. Operation thus performed is difficult, only feasible for specialists very familiar with these regions, and, furthermore, usually is incomplete. Enlarging the maxillary route by total temporary resection, instead of simple trepanation, requires a preliminary general surgical operation, the utility of which is hardly demonstrated. If the preceding interventions do too little, the latter do too much.

3. THE ORBITAL ROUTE.

This leads through the os planum to enter the ethmoid cells (Knapp, Chipault, Luc, Gruening, Goris) and through the superior wall for the frontal sinus (Richter, Panas, Guillemin, Jansen). But if this route is not demanded by reason of a deformity or an orbital fistula it is dangerous for it opens a septic focus into the orbit; besides it displaces the pulley of the superior oblique, exposing the patient to diplopia.

4. THE FRONTAL ROUTE.

This has long been employed (Ollier, Panas, Rollet, Ogston, Luc, Kuhnt) for the treatment of suppuration in the frontal sinus. But surgeons and rhinologists recognize the impossibility of curetting all the ethmoidal labyrinth through the

floor of the frontal sinus, the posterior cells almost certainly escaping, and *a fortiori*, the sphenoidal sinus also.

5. THE NASO-JUGAL OR PARANASAL ROUTE.

We apply this term to the nasal route, enlarged externally by temporary or permanent enlargement of the anterior bony borders of the nasal fossae. Sometimes the enlargement of the pyriform orifice is made by the disease itself, as in the case of the patient operated upon by Chassaignac in 1854, who had planned a temporary resection which was not necessary to carry out. This is what probably occurred to the patient operated upon in 1890, by Quenu, where the sphenoidal sinus was easily entered by following the opening made by the pus.

But, in general, the enlargement should be made by the surgeon. What is the most obstructing part, resection of which, consequently, is of the greatest importance?

Examination of the anatomic structure and study of operations proposed or executed upon the cadaver and the living show that the intrinsic bones of the nose play a capital role in this region from an operative point of view. Instinctively, a number of surgeons since Michaux de Louvain (1843) have attacked them (Chassaignac, Ollier, Gussenbauer, Boeckel, Chalot, Rafin, Moure, Killian) to open a path to the ethmoid, but they have perhaps not sufficiently emphasized that this resection is the key to a well-ordered and complete operation. The apophysis of the superior maxilla may be treated by the surgeon like the nasal bones, but it is of far less importance than the latter. In fact the apophysis corresponds to the middle portion of the nasal fossae, larger and less dangerous than the upper portion, corresponding to the nasal bones.

Among surgeons, some have performed permanent resection of the bony border of the pyriform orifice, for example, Taptas and Killian for suppurative fronto-ethmoiditis, and Moure for tumors of the ethmoid. Most of them—and this after the first operative trials—have advised or done temporary resection (Chassaignac, Langenbeck, Ollier, Boeckel, Lawrence, Bruns, Gussenbauer, Rafin, Chalot).

6. COMBINED ROUTES.

These have been planned either in advance as an operative method, or extemporaneously to fulfill the unforeseen necessities of an intervention.

The ethmoid always being involved in chronic, diffuse infection, and its lateral masses being concealed by the nasal bones, the naso-jugal or paranasal route is always necessitated. If the frontal sinus is involved it becomes, combined with the frontal route, the naso-frontal route, for which Killian has recently mapped out a careful technic, insisting upon the importance of freely excising the ethmoid. If the maxillary sinus of the same side is diseased, it suffices to prolong the cutaneous incision and resection of bone downward to open a large fronto-naso-maxillary opening.

If the lesions are bilateral we would have, analogous to the foregoing, the following routes: 1. Bi-naso-jugal route. 2. Bi-fronto-naso-maxillary route. The nose may be turned aside in a cutaneo-osseous flap upon a hinge which may be either inferior (Chassaignac, Ollier, Gussenbauer), or superior (Lawrence), or lateral (Langenbeck, Boeckel, Bruns, Chalot). The first method renders the upperportion of the nasal fossae more accessible, the second gives more room below, and the third gives access to all the nasal fossa opposite the hinge, and the upper part of the other nasal fossa. Each of these methods of intervention may then have its particular indications.

7. THE ROUTE PROPOSED.

The route which we propose, after having experimented upon the cadaver, and applied it successfully in a case where nasal suppuration had resisted intervention by the alveolar route for the maxillary sinus and by the frontal route for the frontal sinus, is, we will say, that which appears best fitted for unilateral, obstinate pansinusites.

The technique which we advise is not advanced as a new procedure. Original in its ensemble rather than its details, it is designed only to co-ordinate and simplify—in a word, regulate—this surgical intervention.

A. PRELIMINARY STEPS.

The most important is anesthesia. General anesthesia is indispensable. It should be done with chloroform, with the aid of a mask or compress, before the operation. During the operation the chloroform should be given upon a sterilized gauze tampon held with forceps under the nostrils or over the mouth of the patient. Preliminary anesthesia with cocain is useful in dulling the reflexes.

Preventive hemostasis of the nasal fossae is hard to secure. With adrenalin (applications of a 1 to 2000 or 3000 solution) it can be obtained in this region almost as thoroughly as by the use of the Esmarch band on the limbs. In the absence of this agent or in case of its insufficiency, long strips of gauze, pushed as far back as the pharynx, will assure, if not a preventive hemostasis, at least protection of the air passages from blood. Rose's position can be employed for this purpose, but it congests the entire operative field.

B. EXTRA-NASAL OPERATION.

1. *Cutaneous incision* in the form of a 7 (or reversed 7, according to the side, right or left). The horizontal branch is in the eyebrow; the vertical follows first along the internal border of the orbit, then the groove made by the nose and cheek. Incise to the bone in the vertical but not the horizontal part of the incision.

2. *Stripping the periosteum*.—In the vertical branch of the cut, elevation with the rugine of the internal lip should stop at the lacrymal sac in the orbit, and on the cheek at a point corresponding to the root of the canine tooth prolonged. In the horizontal incision, with two strokes of the bistoury, making an arc concave above and one concave below, cut the border of the orbital base, then liberate it above and below the orbital border, near the beginning of the eyebrow only, and lay bare the fronto-nasal suture and the suture of the frontal with the lacrymal bone.

3. *Opening the frontal sinus*, by the frontal route (above the fronto-nasal suture) or by the orbital way (above the suture of the frontal with the lacrymal), or both combined, according to the form and extent of the sinus and the nature

of the lesion. If possible, do not cut the mucosa, which bleeds very freely within and without.

4. *Resection of bone, temporary or permanent.*—If the resection is to be permanent, it is made more rapidly with the rongeur forceps, beginning at the border of the pyriform orifice. The bone is brittle enough laterally, very hard superiorly. In this proceeding the operation inevitably opens the nasal fossa largely.

If the resection is to be temporary, which is preferable, it is necessary to mark out the line of bone section. This should be done with the perforator at the following points: fronto-nasal suture; fronto-maxillary suture; pre-canine depression. These points should be united, either with the electric saw or simply the chisel and mallet. Another stroke with the chisel will separate the suture uniting the two intrinsic bones of the nose.

C. INTRANASAL OPERATION.

1. *Liberation of the enlarged pyriform orifice.*—Turn back the nose to the opposite side, after cutting the nasal mucosa, and, after tamponing, explore by sight and probe the interior of the nasal fossa. Good electric illumination is indispensable.

2. *Ethmoidal Curettage.*—The middle turbinate, easily to be seen in its entirety, is grasped near its insertion and cut or torn away. A grooved director is inserted close to the fronto-nasal suture, parallel to the cribriform plate, thus protecting it. The curette is then used to scrape away the lateral mass of the ethmoid, maneuvering from above downward and from without inward, that is to say, away from the dangerous points (the cribriform plate and the os planum) toward non-dangerous ones. The anterior and posterior cells are all accessible by this method.

3. *Sphenoidal curettage.*—The ethmoid being removed, it is sufficient to push the tip of the grooved director into the depths; it goes directly to the anterior wall of the sphenoidal sinus and breaks into it; the curette, guided by the director, enlarges the opening and clears out the sinus.

4. *Fronto-nasal curettage.*—Through the frontal or orbital breach the frontal sinus is quickly curetted, then the

floor is freely opened into the nasal fossa. Do not stop until "a large communication between the nasal cavity and the frontal sinus is permanently assured."—(Killian.)

5. *Naso-maxillary curettage*.—Resect at least the anterior half of the inferior turbinate. Pierce the nasal wall of the sinus with a gouge and excise it as widely as possible, especially at its middle and inferior portions. Through this wide breach, curette the sinus.

These intranasal steps can and should be executed with rapidity, by reason of the hemorrhage which ceases only when the healthy, and especially the diseased, mucosa has been excised or curetted. Their execution will be considerably facilitated by the employment of adrenalin.

D. SUPPLEMENTARY STEPS.

1. *Hemostasis*.—Moderately forcible tamponing with at least three strips of gauze, one naso-frontal one nasal, one maxillo-nasal. Ligature or torsion of the cutaneous arterioles.

2. *Suture*.—After replacing the nasal pyramid and coaptating the resected bony fragments, careful cutaneous suture.

3. *After-treatment*.—Remove the gauze after 48 hours. Lavage ad libitum or if intra-nasal infection is feared. Removal of cutaneous sutures between the eighth and tenth days.

E. PROGRESS.

The operative sequelae should be trifling. The thermometer will vary from 37 to 37.5 degrees C. Locally, the skin will unite rapidly, the bony callus will form for three weeks, at first a little exuberant, then diminishing in size. If there was excision of bone a slight depression will remain near the inner canthus of the eye. The nose secretes mucus at first, then abundant, clear mucus, the secretion finally becoming normal.

It is possible that some fever may ensue. The temperature may go above 37.5 and go nearly to 38 in the evening, during the first few days while the debris of the diseased tissue is being eliminated, having been detached but not removed by the

operation. Nevertheless the general condition is reassuring in spite of the tendency to pyrexia. Sometimes, also, there is a small scale of detached bone which necroses and its elimination is accompanied by a transitory fistula.

As for true post-operative accidents of septic origin, they are the less probable in proportion as the incision has been large, in other words, as the drainage is free.

Rapid progress to permanent cure is the rule, according to Killian, in cases operated by the fronto-nasal method, the technic of which he has published. Our operation done several months before Killian's publication, was inspired by the same principles as were the interventions of this surgeon. It was likewise followed by rapid and permanent cure.

PERSONAL OBSERVATION (PICQUE AND TOUBERT).

M. C., aged 44 years, an employe of the Asiles de la Seine, was attacked in 1901 with suppuration of the right maxillary sinus. The sinusitis was treated by M. Laurens by alveolar puncture and lavage; it was cured in a few weeks.

In February, 1901, the patient complained of frontal headache and intermittent nasal suppuration, somewhat abundant. Trepanation of the anterior wall of the frontal sinus was done by Picque; the sinus was drained through the incision. The wound remained fistulous after removing the drain, and the patient continued to suppurate and suffer until the beginning of May. On May 1, Toubert, being called to examine the patient, made a rhinoscopic examination.

General condition.—Satisfactory. However, the patient suffers, is uneasy and unfitted for continuous work because of constant headache with slight intermittent vertigo, and especially because of profuse nasal suppuration.

External examination.—Cutaneous fistula leading into the right frontal sinus. No facial or palatal deformity.

Anterior rhinoscopy.—The right nasal fossia is coated with very thick mucus, especially over the turbinate and in the middle meatus. No pus visible when the head is erect; but when the patient remains 10 or 15 minutes with the head bent strongly forward pus appears in the naris in large drops, and an examination with the speculum shows that the pus issues from the middle meatus. Exploration with a blunt

probe reveals friability of the ethmoid, which has been softened by suppuration; the denuded bony lamellae are felt to crumble under even light pressure.

Posterior rhinoscopy.—Pus in flakes on the vault and on the extremities of the superior and middle turbinates.

Exploratory puncture of the maxillary sinus.—Made through the inferior meatus, at the point of election, with Lichtwitz's trocar and followed by lavage. No pus discovered.*

Conclusions.—(a) Right frontal sinusitis, opening externally and without communication (or, rather, insufficient communication for drainage) with the middle meatus.

(b) Anterior and posterior right ethmoiditis, with, possibly, involvement of the sphenoidal sinus.

(c) It is probable that the right maxillary sinus is no longer infected, but that it serves intermittently as a reservoir for pus coming from the frontal sinus, perhaps, and certainly from the ethmoid.

Indications for operation.—First, to suppress the focal ethmoidal osteitis and follow up the necrosed parts even to the sphenoid if necessary; second, to transform the external fistula of the frontal sinus into an internal fistula by taking away the floor of the sinus and by autoplasty of its anterior wall; third, preventive drainage of the maxillary sinus through the nose, by freely opening its internal wall at its lowest portion.

Operation.—After several trials upon the cadaver, this was done May 6 by Toubert, to whom Picque entrusted his patient, in the operating pavillion of St. Anne's Asylum, with the assistance of L. Picque, R. Picque and Dagonet, who administered the anesthetic.

The preliminary steps were executed as in the typical operation previously described, with the exception that adrenalin was not employed.

The cutaneous incision was rectangular, inclined down-

* Examination of the sinus by transillumination could not be made. But, by reason of the fistulous condition of the right frontal sinus, it was useless for this cavity, for the maxillary sinus puncture furnished sufficient proof. As for the ethmoid, transillumination would not show the state of the labyrinth.

ward and outward instead of 7 shaped, because of the pre-existing frontal incision which was vertical. The step of opening the frontal sinus was unnecessary because of the previous operation. Temporary resection of the nasal bone and the maxillary apophysis of the right side was done with the perforator and chisel. The intranasal operation was done as described above. Hemorrhage was abundant, almost alarming, during the latter step. It ceased spontaneously as soon as the curettage was finished. The operation lasted thirty minutes, sutures included.

Tamponade and drainage through the nostril. Subcutaneous injection of artificial serum. Extraction of gauze on the third day and of the sutures on the eighth. Union throughout, except superiorly, where the edges of the old frontal sinus fistula had been freshened, and near the unguis.

Headache ceased after the second day; the purulent discharge was replaced at first by the expulsion of clots, then by a rather abundant hydrorrhea which continued nearly three weeks. Exeat.

At the beginning of June, one month after intervention, the patient was again seen. The face has resumed its normal aspect, excepting the frontal scar which is depressed; the suture line is almost invisible; a small sequestrum had been extruded near the lacrymal bones. By anterior rhinoscopy the nasal fossa is found to be much less enlarged than might be supposed: its appearance resembles that of atrophic rhinitis. The mucosa is pale, of a cicatricial aspect, barely moistened with mucus; no crusts, no pus. The handkerchief of the patient has no purulent spots on it. The secretion of pus, which before operation was so annoying as to prevent working when the head was bent forward is entirely stopped. The patient has neither headache nor vertigo; he is again happy and manifests his satisfaction at being cured.

* * *

The proposed operative technic appears to us to present a maximum of advantages with a minimum of inconveniences.

The sole drawback is the fear of a visible cicatrix. This fear has been exaggerated. Since the first operations, those of Chassaignac and D'Ollier, for example, done in the pre-antiseptic period, the cosmetic result has been observed to be

satisfactory. With asepsis still better can be done. What disfigures the patient is not so much a cicatricial line, which is nearly always concealed, for that matter, in the eyebrow or naso-jugal groove, as a depressed scar like those left by a large abrasion of the anterior wall of the frontal sinus (Kuhnt's procedure). Free drainage of the frontal sinus by free excision, so to speak total, of the ethmoid permits a reduction to the minimum of the frontal or fronto-orbital trepanation, on the well-understood condition of sparing the orbital arch, which surgeons nowadays, Jansen and Killian in particular, endeavor to preserve intact.

The patient upon whom we operated declared himself very well satisfied, in spite of a depressed, vertical, frontal cicatrix, which proves that these patients do not consider the cure too dear, even at the expense of slight deformity.

Even if excision of the nasal bones and the ascending portion of the maxillary has been done, the subsequent deformity is still slight, since Moure who employed this method for the extirpation of tumors in the ethmoid, declares that "there is rarely a little depression at the inner angle of the eye," and concludes that "the cosmetic result is perfect and fronto-orbital trepanation and excision of the nasal bones proper," likewise affirming that he has been able to cure his patients without disfiguring them. His results have been confirmed by Luc quite recently.

With these reservations from a cosmetic point of view, and they are of little importance, the proceeding which we advise offers advantages only.

First. The operation is rapid. Despite incomplete experience, we were able to finish our operation in thirty minutes. If it had been a bilateral pansinusitis we would very probably have been able to terminate it in forty-five minutes. Luc, whose experience in the matter is considerable, declares that he devoted three hours to the radical cure of one case of this sort, and hence advises taking account "possible fatigue of the operator."

Second. The operation was done at one sitting and this was greatly appreciated by the patient, who had undergone operations by natural routes and desired an ending of the matter.

Third. The intervention demands no special apparatus except good illumination—the electric light. Bistoury, mallet, chisel, curettes and grooved director are sufficient.

Fourth. It is easy for every surgeon, even those who are not also rhinologists. Free opening of the nasal fossa makes the most complex operative step the most simple, and while the conditions required according to Killian, "profound knowledge of the frontal sinus and ethmoid, close study of dry and fresh specimens, and repeated operation upon the cadaver," are not without value, they are not absolutely indispensable "to those who desire to treat these cases with success and avoid failure."

Fifth. The operative results are simple and do not demand rhinologic treatment afterward. The larger the operation the greater is the chance of avoiding either persistence or recurrence of suppuration, quite frequent after incomplete operations, judging by the number of cases collected by Guisez, or the phenomena of retained catarrhal fluid, even if non-septic as in Luc's case, previously operated upon by Schwarz.

The conclusions to be drawn from the reported cases, in which the most varied treatment has been tried, are the following:

1. The surgeon should not intervene until after calling upon the resources of rhinology for diagnosis, that is to say, after establishing the probable pathologic anatomy of lesions which, by reason of their extent and depth, would be inaccessible to petty surgery of the nasal fossa.

2. It is necessary to operate by attacking obstacles directly, conforming to the principles of real surgery, which is "open surgery." There is thus substituted for a delicate, difficult, sometimes dangerous, operation, one that is well defined, rather easy, harmless and effective.

3. The results obtained seem to be more satisfactory both for the patient and for the surgeon, who will thus have acted *cito, tuto et jucunde*.

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ABSTRACTS FROM CURRENT OTOLOGIC, RHINO-
LOGIC AND LARYNGOLOGIC LITERATURE.

I.— EAR.

The Electro-Catalytic Treatment of the Ear.

URBANTSCHITCH (*Monatsch. f. Ohrenh.*, November, 1902) for many years has used the constant current in the treatment of the difficulty in hearing remaining after otitis media purulenta and chronic catarrh. He based this on the fact that at the cathode there were an increased blood and lymph current and chemical changes. At the anode a hard and at the cathode a soft cicatrix arises. He used for the ear a screw like electrode, wound about with moist cotton. The cathode is placed in the ear, the anode in the hand. The drum and labyrinth wall will stand usually only 1-10 to 2-10 miliamperes. Otherwise there will be dizziness and pain. The current must be gradually increased and diminished. The author reports 10 cases (18 ears), treated some for months at a time. In 6 ears, that is a third of the cases there was an improvement, either of hearing or subjective noises or both. In all cases, the ordinary methods were without results. In a few cases, suppuration appeared.

Levy.

Are There Anastomoses Between the Vessels of the Middle Ear and those of the Labyrinth.

T. BRAUNSTEIN and G. BUHE. (*Arch. f. Ohrenh.* Bd. 56.) By means of experiments undertaken by both authors separately, it was shown that, contrary to Politzer's belief, the vessels of the middle ear entered the promontory but not the labyrinthine capsule.

Levy.

The Influence of the Radical Operation on Hearing.

BUHE. (*Archiv. f. Ohrenheil.*, Bd. 56.) The author, with this in mind, examined the material of the Halle clinic since the year 1894, in all 112 cases. He insists that the results in the different clinics should not be compared so long as there is no standard method of examination. Nine cases were deaf before and after the operation; of the others, 34 per

cent. were bettered, 36 per cent. remained the same, and 30 per cent. became worse. A considerable bettering of the auditory nerves was achieved only when the chain of ossicles was diseased and the labyrinth intact. If the hearing before the operation was w. at 1 m., it usually became worse. Pus did not show a demonstrable influence. *Levy.*

The Site of the Reflex Center for the Musculus Tensor Tympani.

HAMMERSCHLAG. (*Arch. f. Ohrenheil.*, Bd. 56.) Experimental sectioning succeeded in proving that the reflex center for the tensor tympani lay in the medulla oblongata. In the cat, the upper limit lies immediately behind the posterior corpora quadrigemina, and the lower limit at the beginning of the lower third of the medulla. *Levy.*

Deaf-Mutism in Relation to Observations of Aurists.

BEZOLD. (*Bergman's Verlag.*, Wiesbaden, 1902.) In the 34,000 cases of ear diseases treated by the author, there were 456 deaf-mute, i. e., 1.3 per cent. He divides his findings into 12 heads, 51 per cent. acquired, 43 per cent. congenital deafness, 6 per cent. doubtful. In 45.9 of the congenital, and 21.5 per cent. of the acquired deafness, there were remains of hearing for speech. The time of the becoming deaf, sex, heredity, near relationship of parents, drinking, idiocy, etc., are discussed in detail. 4 cases were caused by measles, mumps and diphtheria, 13 by hereditary lues. The author designates his work as the forerunner of a large collection of statistics. *Levy.*

Various Operative Procedures for the Relief of Chronic Suppurative Otitis Media, and Their Comparative Value.

EDWARD B. DENCH, New York. (*American Journal of the Medical Sciences*, Nov., 1902.) Ossiculectomy and the radical operation for the cure of suppurative otitis are the procedures considered; and the details of the operation are given in each instance. The author's later experience has led him to believe that conservative surgery for chronic otitis is a mistake rather than an advantage; and he thinks that the field of the operation of ossiculectomy will become more and more restricted as the experience of the surgeon widens.

Of the cases of suppurative otitis subjected to ossiculect-

tomy the statistics show that in about one-half recovery has been complete.

He regards the removal of the incus as an essential part of the operation, and says that it ought to be hunted for even though considerable time is taken, and the operator should be absolutely sure that it has been removed before considering the operation of ossiculectomy finished.

In the case of radical operation, he believes in a thorough and complete operation, so as to remove every bit of diseased bone, going as far in every instance as may be necessary to do this, even though the dura or the lateral sinus be exposed.

So far as the published statistics go, the results of the radical operation are not as yet very much better than for the operation of ossiculectomy, although the author's personal statistics for the radical operation are much better than for ossiculectomy.

As to the choice between the two, the simpler procedure may be resorted to where the caries is limited, and where there is no history of recurrent attacks of acute inflammation of the middle ear. Where, however, there is a history of recurrent attacks of acute inflammation in the course of purulent otitis, and where these acute attacks are accompanied by symptoms which make one suspect that these may be beginning infection of the mastoid, labyrinth or intracranial structures, the radical operation should invariably be chosen.

The important question as to the effect of these various operations upon the hearing is considered. In the author's own experience, ossiculectomy has seldom reduced the hearing but has in many cases improved the power of audition. As to the radical operation, he does not believe that the surgeon is warranted in promising the patient that the hearing will be as good after the operation as before, unless the power of audition is very much diminished in the affected ear at the time of operation.

As in many of these cases the preservation of the function of hearing is not of as much importance as the question of danger to life from the suppurative process, the question of hearing in many cases may be disregarded, and that operation done which seems, all things considered, to be the most suitable to the individual case.

Richards.

Purulent Phlebitis of the Sigmoid Sinus without Thrombosis: Death from Meningitis: Autopsy.

ARNOLD KNAPP, New York (*Archives of Otolaryngology*, Vol. XXXI, No. 5), summarizes thus:—A patient with unquestioned pyemia of aural origin, having 2-3 chills a day, at operation presented an enormously distended sinus with a thin but healthy anterior wall; the sinus contained fluid blood. The sigmoid sulcus was normal. The bone posterior and external to the horizontal semicircular canal seemed unhealthy, and the neighboring dura was covered with apparently healthy granulations. The pyemic condition, though improved at first, continued; the swelling in the right suboccipital triangle became circumscribed. At the second operation the floor of the occipital bone was explored to no purpose, and as the bone near the labyrinth seemed unhealthy this was further resected. No new lesion found. The lateral sinus still contained fluid blood. The jugular vein was ligated. The patient's condition grew steadily worse; meningitis became more marked, and led to the patient's death.

At autopsy, meningitis was found, the descending portion of the sigmoid sinus was enormously distended; the anterior wall was very thin but healthy. The posterior wall measured 6 mm.; all coats of the venous wall were infiltrated, the central part red and the part projecting into the lumen gray and rough, apparently necrotic. This infiltration extended down through the bulb to the beginning of the jugular vein, thus producing the deep suboccipital induration. The cerebellar surface of the dura appeared healthy. The sinus contained a recent blood-clot. *Campbell.*

Otitic Brain Abscess: Report of Two Cases.

GEORGE F. KEIPER, Lafayette, Ind. (*Jour. Amer. Med. Assoc.*, Mar. 21, 1903). Two cases are reported, both subsequent to chronic suppurative otitis. In the first case there was high temperature with remissions and the abscess was in the temporosphenoidal lobe. It was drained, but death occurred six days later.

In the second case the first attempt to find the abscess was unsuccessful. Eighteen days later the patient became unconscious, the wound was re-opened, a bulging dura found,

and an aspirator located the pus. A drainage tube was inserted and recovery took place without untoward incident. The wound had to be re-opened once and a little more bone removed so as to improve the drainage. Asphagia was very marked. Recovery has been complete. *Richards.*

Electrolysis in Eustachian Salpingitis with Stricture; Report of 75 Cases.

ELLWOOD MATLACK, Philadelphia (*American Medicine*, Feb. 7, 1903), has used eustachian electrolysis in 75 cases, during one year; not selecting his case, but using it in every deaf person applying for treatment that was willing to submit to it. Some of his patients had been deaf for 20 to 25 years; in others the trouble followed various systemic diseases; and some presented cicatricial conditions following old otorrhea. Very few were typically favorable cases in which the pathologic changes were confined to the tube. The symptoms usually associated with eustachian obstruction, that is, deafness, with a sense of fulness in the head and varying abnormal sounds, were almost invariably relieved or cured in cases in which eustachian obstruction seemed to be the cause, and he thinks that this cure will remain permanent provided the nasopharynx is kept in normal condition.

In one case of a man of 34 years the deafness had been increasing since childhood, and the voice could only be heard when much intensified. There were cicatrices in both tubes. On the restoration of the normal caliber of the tubes the hearing while not normal became sufficient for all ordinary occasions. Another patient was able to discard the use of the hearing trumpet.

In seven cases of aural sclerosis without marked tubal obstruction but with secondary involvement of the auditory nerve, electrolysis was unsuccessful.

Occasionally a little temporary swelling of the tissues has followed the withdrawal of the bougie, sometimes lasting several hours and accompanied by an increase of deafness and other symptoms.

The current should be used only once a week. The best results are obtained in connection with any other measures

that have been found of service in the pathological conditions present.

Excluding purely labyrinthine conditions, the author regards electrolysis of service in almost all other forms of deafness, and especially in cases of moderate degree, in which the most pronounced changes are in the tube.

"The current used varied in strength from one to five milliampères, and was obtained from an ordinary galvanic battery, the positive (sponge) electrode being held in the hand of the patient, and the negative (gold-tipped wire) passed through an insulated eustachian catheter for about 35 mm. into the middle ear cavity. The duration of treatment was one minute or less as a rule. The bougie, after one or more applications, gradually overcomes the resistance of the stricture, and finally enters the tympanic cavity and there moves freely. Successive sizes are passed until the tube has resumed its normal caliber. This result can be secured in the vast majority of cases, but not in all."

The instruments and the nasal cavity should be made as aseptic as possible, and with care little inconvenience will be felt by the patient.

In one case after application a slight emphysema of the face, lasting a few hours, followed; and in another instance an acute otitis media developed during the course of the treatment, but the author thinks this latter was probably due to influenza.

Richards.

The Value of Bacteriologic Examination of the Discharge in Acute Otitis Media as Determining the Necessity of Operative Interference.

EDWARD B. DENCH and FRANK M. CUNNINGHAM, New York. (*Transactions of the American Otological Society*, 1902.) As a result of studies made at the New York Eye and Ear Infirmary, the conclusions are reached that in obscure cases much can be learned from a careful microscopic examination of the discharge from the ear. There must necessarily be in every case of purulent inflammation of the tympanum some involvement of the mastoid antrum. At the very onset of symptoms of mastoid involvement the local application of cold to the mastoid is justified. The external auditory canal having first been sterilized, free drainage from the

middle ear should be secured by an extensive incision of the drum membrane, this incision being carried upward on the upper wall of canal for a considerable distance in order to relieve tension in the mastoid antrum. After such incision has been made the canal should be irrigated frequently with 1-5,000 bichloride of mercury. Local application of cold should not be persisted in longer than 48 hours and usually not more than 36 hours. Whether the inflammatory process will extend depends upon the character of the infection. In all cases of streptococcus infection, there was a tendency for the inflammatory process to extend rapidly to the osseous structures, and when this has occurred the only possible way of effecting a complete cure is by the evacuation of the pus by thorough operation. In those cases in which the free incision of the drum membrane and the local application of cold had produced abortion of the acute symptoms, the diplococcus pneumoniae was the organism found in the discharges.

In those cases of pneumococcus infection, with three exceptions, in which operations were performed, the mastoid was less diseased than was the case when any other infectious organism was present; so that the author regards the presence of the pneumococcus as the sole etiological factor significant of a rather mild form of inflammation in the mastoid cells.

In the case of streptococcus infection, the rate of progress of the inflammatory process is very rapid; in many cases in which the inflammatory process had existed but from 48 to 72 hours there was extensive destruction of the bone. The use of ice in cases of streptococcus infection is absolutely unwarrantable, and the author thinks it unwise in case of streptococcus infection to endeavor to abort extension of the inflammatory process. If free drainage and absolute cleanliness do not cause the mastoid symptoms to disappear at the end of 48 hours, immediate operation is demanded.

In cases of mixed infection, in which the streptococcus is present, the majority of cases will require operation.

Richards.

Case-Book Record of 183 Operations on the Mastoid Bone.

LEVI JAY HAMMOND, Philadelphia, Pa. (*Phila-*

delphia Medical Journal, Jan. 31, 1903). Of the 183 cases 37 were operated on for chronic suppurative from antrum and attic, while 103 were mastoid cases in which the present attack was the first ear trouble complained of. There were 12 cases of Bezold mastoiditis. After operation on the antrum and attic the average period of convalescence was five weeks, and in the cases associated with chronic suppurative otitis, it was five and three-tenths weeks.

Richards.

The Surgical Anatomy of the Middle Ear; A Factor in Favor of Early Interference in Suppurative Affections.

EMIL AMBERG, Detroit, Mich. (*American Medicine*, Nov. 15, 1902.) Various cuts from the author's dissections are shown and the following anatomic points considered:

1. The tympanum, epitympanum, aditus ad antrum, antrum and mastoid cells form one cavity, connected with the pharynx through the eustachian tube.
2. The floor of the tympanic cavity and the floor of the mastoid antrum do not form one smooth plane with each other but are separated like to valleys; hence the middle-ear suppuration involving the mastoid antrum and mastoid cells may come to a standstill so far as the tympanic cavity is concerned, and yet the process go on in the antrum.
3. The mastoid cells lie in all directions from the antrum; hence the necessity of thoroughly investigating every diseased portion.
4. The three ossicles of the middle ear serve to make the epitympanic space and the tympanic cavity uneven and complex.
5. The roof of the epitympanic cavity is very thin.
6. The lateral sinus is imbedded in the mastoid cells without having a firm protection,
7. The facial nerve is sometimes imperfectly protected.
8. The bulb of the jugular vein is separated from the floor of the tympanic cavity by a thin layer of bone only.
9. The carotid artery is so located that caries of the lower floor and inner wall of the tympanic cavity can extend to it.

10. The relation of the inner ear to the middle ear and to the cranial cavity is a close one.

In early years the petrosquamosal fissure runs the whole length of the tegmen tympani.

In old suppurative cases the sclerosis of the outer wall of the mastoid process may cause the pus to work its way to the points of least resistance, frequently obscuring the symptoms.

Richards.

A Case of Scotoma Auris Partiale Centrale et Periphericum.

EMIL AMBERG, Detroit, Mich. (*Jour. of A. M. A.*, Jan. 17 & 24, 1903.) The patient was 40 years of age and suffered from otitis media catarrhalis chronica. She stated that she could hear a clock at home when it was in a position upward from her right ear but could not hear the same clock at the same distance from the ear when it was on a level with the ear. On examining her with the watch it was found that at a distance of three and three-quarter inches it was heard at a height corresponding to the top of the auricle, whereas it was not heard at the same distance directly opposite the canal or below it.

The cause of this condition the author thinks to be the conformation of the concha and meatus, and he names the phenomenon: "Scotoma auris partiale centrale et periphericum."

Richards.

The Anatomy of the Carotid Sinus.

H. HAIKE. (*Arch. f. Ohrenheilk*, Bd. 57.) The sinus caroticus was studied by the author with an injection apparatus. It was thus seen that the carotid in its ascending and horizontal part was surrounded by a thick network of veins, while the knee was almost free. The appearance of a sinus similar to the sinus cavernosum occurs late in life, by the fusing of the large twigs. For this, the term plexus is better. The clinical importance of the sinus arises from the fact that the venae carotico-tympanicae run to the middle ear, and sinus wall is a continuation of the dura. A hemorrhage from the sinus can sometimes be mistaken for one from the carotid.

Levy.

The Performance of the Radical Operation Under Schleich's or Local Anesthesia.

G. ALEXANDER reported (*Arch. f. Ohrenheilk*, Bd. 57.)

in an earlier publication 11 cases of acute mastoiditis operated under Schleich's anesthesia. He has carried out the radical operation 3 times under Schleich's anesthesia. He finds that the evacuation of the contents of the middle ear and the antrum with the sharp spoon, and the cleaning of the ostium tympanicum tubae was not without pain. Therefore Schleich's should be used in radical operation only when narcosis is strictly contraindicated. *Levy.*

Treatment of Acute Purulent Otitis Media.

E. J. MOURE, (*Journal de Medicine de Bordeaux*, May 25, 1902.) Treatment of acute otitis media may be divided into two periods, first that preceding the suppuration, when the exudate is serous, sero-purulent or hemorrhagic, second the suppurative period. In the first stage if the pains are not too severe the object of treatment should be to bring about a resolution of the exudation, and avoid perforation into the tympanum.

In the second stage, the membrane should be immediately incised, and hot fomentations applied, to facilitate a discharge of pus. Hot douches may be used two or three times a day, and may be accompanied by sprays into the nose of an oily solution of boric acid and menthol. The author advises against inflations of air into the ear by any method as dangerous, since they favor the introduction of septic germs into the naso-pharynx. *Goodale.*

Sequestrum Comprising the Internal Auditory Meatus, the Superior and Posterior Semicircular Canals, and the greater part of the Vestibule.

DR. HUGH E. JONES. (*Jour. Laryng. Rhin. Otol.*, Feb., 1903.) The sequestrum had been removed from a patient, aged twenty, a subject of hereditary syphilis and suppurative otitis media from infancy, with double facial paralysis.

Two years ago the complete post-aural operation had been performed on both sides. Recently there had been recurrence of suppuration in the right ear, the left remaining quite sound.

In July, 1902, the sequestrum shown was removed by post-aural incision, and the cavity grafted with partial success.

September 30.—Hearing: right, nil; left, fork very slightly both B.C. and A.C.

On November 14, the patient was doing well, with some return of power in the right side of face.

Portions of Temporal and Adjoining Bones (right side with Malignant Growth the size of a Walnut Springing from the Tympanum, and Invading the Under Side of the Temporo-Sphenoidal Lobe.

E. DEANSLEY. (*Jour. Laryng. Rhin. Otol.* Feb., 1903.) There was a history of aural discharge and slight deafness ever since scarlet fever in boyhood. In October, 1901, he began to have frontal headache, giddiness, and progressive loss of vision. He applied for treatment March, 1902, and was then found to have marked double optic neuritis, but no localizing cerebral symptoms. A small polypus protruded from the meatus, but malignant growth was not suspected. The tympanum contained a little pus and granulations, but the antrum and mastoid cells when opened appeared normal. The temporo-sphenoidal lobe was explored through the tegmen tympani, and the cerebellum and lateral sinus through a backward extension of the wound, but beyond considerable increase of intracranial pressure nothing was found.

Patient left the hospital one month after this operation completely relieved, but with optic neuritis no better. Symptoms recurred in two months, and he became quite blind. In July, 1902, he died, three days after a second operation for the relief of pressure.

Case of Tumour of the Meatus Associated with an Abdominal Tumor.

MR. ARTHUR H. CHEATLE. (*Jour. Laryng. Rhin. Otol.* Feb., 1903.) A lady, aged about forty years, was first seen on April 4, 1902. She had never had trouble in the ear until October, 1901, when she had trouble in the right meatus, which caused pain and discharge; improvement occurred, but in the beginning of April, 1902, the discharge recurred, and deafness had been experienced with pain for some weeks. On examination, the anterior meatal wall was swollen, almost blocking the passage, and a granulation was present between the swelling and the roof of the meatus. There was no

swelling or tenderness outside the auricle. Everything pointed to a boil, and it was treated as such. She was not seen again until July 26, 1902, when she stated that the treatment ordered at the first visit had relieved her, and that the ear seemed well until May or June, when it began to get stuffy again, with occasional shooting pain. On examination, the aspect of affairs was precisely the same as at the first visit. This was so suspicious that a piece was cut out for microscopic examination, and Mr. Shattock reported that it was an endothelioma, while others have pronounced it to be an epithelioma. Finding that it was a malignant growth, arrangements were made for a thorough removal. Before this was done her doctor found out that she suffered from some abdominal trouble, and on examination discovered a big lump in the lower abdomen.

A thorough examination was made by Dr. Herbert Spencer under an anesthetic, and his report was as follows: "In the abdomen is a tumor, in places cystic, but for the greater part feeling solid, not absolutely fixed, reaching nearly to the umbilicus. The tumor extends behind the uterus and is distinct from it; it is clearly an ovarian tumour. The uterus is not enlarged, is in front of the tumour, and slightly movable. On the left side of the cervix, in the situation of the left utero-sacral ligament and evidently in the peritoneum, are two small nodules as big as the end of the finger, hard and fixed. They appear to be secondary growths in the peritoneum." Dr. Spencer decided not to interfere unless, in a few months' time, it was found that the "malignant secondary growths" had not increased in size.

In the face of the opinion concerning the abdominal trouble it was clearly unnecessary and unsurgical for an operation on the ear.

She was sent home with orders to keep the ear clean with lysol, and she has since reported that it is quite comfortable and that she is hearing well. The case demonstrates the necessity of a thorough general examination in tumors of the ear.

Case of Cholesteatoma of Attic and Antrum, with Good Result by Operative Opening of these Parts, with Preservation of the Ossicles, Membrana Tensa, and Cholesteatoma Matrix.

DUNDAS GRANT. (*Jour. Larynx., Rhin., Otol.*, Feb., 1903.)

Grace, W., aged eight, was referred by Dr. Anstruther Milligan on account of pain in the left ear and a history of otorrhea of twelve months' duration. The disease had probably originated in an attack of measles three years previously, but the pain of which she complained had come on suddenly one week before Dr. Grant saw her. She complained of slight vertigo and singing noise in the left ear-pain over the mastoid region, and slight swelling. A blister had previously been applied. A granulation projected in front of the handle of the malleus; there was no perforation found; it thus seemed pretty certain that the polypus grew from the attic, and it was accordingly removed. It was then evident that there was a large perforation in the membrane of Shrapnell. Two days later there was a copious discharge of blood and skin-like formations. He then decided to operate, but in view of the excellence of her hearing and the integrity of the membrana tensor and ossicles, he proposed to endeavor to preserve these. Accordingly the operation was carried out as for the ordinary radical mastoid operation. He chiselled away the outer wall of the attic under the protection of an angular guard, also the bony wall intervening between the mastoid cells and the external auditory meatus, and thus opened into a cavity filled with broken-down epithelium and lined by a fairly homogeneous shiny membrane. He scraped out the contents, leaving the matrix *in situ*, and turned back a flap from the posterior wall of the membranous meatus, then filled the cavity with iodoform moistened with 1 in 20 carbolic solution. Unfortunately, the occurrence of an outbreak of scarlet fever necessitated the removal of the patient to her home six days after the operation, where she went through an attack of this disease. From the time of the operation the patient was free from the pains of which she had previously suffered, and under Dr. Milligan's treatment the ear was nearly dry in from six to eight weeks.

Case of Objective Clicking Tinnitus.

E. CRESSWELL BABER. (*Jour. Laryng. Rhin. Otol.*, Feb., 1903.) The patient, a lady, aged thirty-five years, was first seen November 8, 1897, with a history of a clicking

noise chiefly in the right ear, which came on after an attack of influenza in February, 1896.

On examination, a faint clicking noise could be heard by the observer in either ear, loudest on the left side, with or without an auscultation tube. The pharynx showed spasmodic contraction of the velum, not always coincident with the noise.

She was treated with valerian and bromide, amongst other drugs. The continuous current was applied externally and to the palate, and an astringent paint was used to the pharynx.

On March 3, 1898, the note made was: "Noise almost ceased. It only comes on when she makes a muscular movement now." The patient was not seen again till recently (November 15, 1902), when she reported as follows: The noise has never ceased entirely. There have been two bad attacks since the last note. Two months ago she had a cold, which aggravated the noise. The latter varies much in frequency, and is very rapid when bad.

Present State.—A clicking noise, which has often a reduplicated character, can be heard with or without the auscultation tube in the left ear, more faintly in the right.

H.D. whisper, perfect both sides.

T.F. a'. Rinne, mastoid, B +, L +.

Bone conduction perfect on both mastoids.

R.M.T. slight manubrial injection, opaque, somewhat retracted.

L.M.T. opaque, somewhat retracted.

During the noise no movement of either membrane can be detected by the sight, or with an ordinary manometer (the meatus being full of air). Politzerizing does not change the appearance of the membranes or arrest the noise.

Pharynx.—Small granulations on the margin of the velum and small vessels on the posterior wall, which is catarrhal.

With each noise a slight spasm, with depression of the soft palate, takes place, which is most marked on the right side.

Larynx, normal. No movement of the thyroid cartilage can be detected during the noise.

Cocaine sprayed into the pharynx diminishes the noise slightly for a minute or two.

By posterior rhinoscopy the cushions of the Eustachian tubes are seen to be congested, but no movement of them can be detected.

A movement of the levator cushion can be seen during the noise.

No thickening in the vault of the naso-pharynx.

Case of Epithelioma of the Middle Ear.

ARTHUR H. CHEATLE. (*Jour. Laryng., Rhin., Otol.*, February, 1903.) The patient was a woman, aged sixty-three years, who came to King's College Hospital complaining of deafness and discomfort in the left ear of only a few weeks' duration. There was no discharge or history of discharge.

The middle ear was occupied by indolent-looking granulation tissue, pushing forward an apparently intact drum, which was incised and showed the granulation tissue behind; some of this was removed with the curette, and found to be epitheliomatous.

The progress of the disease had been very rapid during the two months following the examination. A mass had grown in the post-nasal space on the left side, pushing down the soft palate, which was paralyzed on that side. The mouth was drawn to the right, and the tongue showed paralysis of the left hypoglossal nerve. The pain in the ear had not been great, but was increasing. Some enlarged glands could be felt in the neck behind the jaw.

The onset of the ear trouble was very insidious, the appearance when first seen closely resembling a subacute inflammation of the middle ear, with a collection of fluid behind an intact drum.

A Case of Chronic Purulent Otitis; Extradural Abscess; Meningitis; Death; Autopsy.

ARNOLD KNAPP, New York. (*Archives of Otolaryngology*, Vol. XXXI, No. 5.) A man of 34 had suffered from left-sided otorrhea for 20 years. On admission he complained of pain about the ear and over the left eyebrow; vertigo and very fetid discharge. The Mt. is absent. There are granulations in the tympanum. On operation the antrum contained pus and granulations. The ossicles were absent. A reddish fibrous cord was seen passing over the oval window, and could be

followed into the aqueductus Fallopii; this was the inflamed facial nerve.

For 12 days the course was uneventful, then very severe head pains set in. Temp. 104° F., P. 90. Eye grounds normal. Evening temp. 101° F., and next morning 105.3° F. The presence of intracranial complications was now very apparent. The sinus was exposed and found healthy. A short distance internally to it a well-defined extradural collection of pus was evacuated and a small perforation found in the dura from which cerebro-spinal fluid escaped. Meningitis had already set in, for on the following day a paralysis of the left external rectus, delirium and extreme frontal headache set in. The patient became comatose, lumbar puncture drew off turbid fluid.

On autopsy the sinuses were free, the aqueductus Fallopii showed a large defect in the posterior tympanic wall. The oval window was enlarged downward, containing granulations and a remnant of the stapes. The internal auditory nerve and its contents appeared normal. *Campbell*

A Brief History of Bacteriologic Examinations in Suppurative Otitis Media, with Remarks on the Relative Virulence of the Various Micro-Organisms.

PHILLIPS, New York. (*Archives of Otology*, Vol. XXXII, No. 1.) The author points out the necessity of making bacteriologic examination of the pus in all cases of purulent otitis media immediately after a paracentesis or spontaneous rupture of the Mt.

Where micro-organisms are found in combination we are accustomed to report the inflammation as due to the predominating type of micro-organism.

The streptococcus is the most virulent of all the pathogenic organisms found in purulent otitis. This is true, both as to the rapidity of its invasion and to the severity of the accompanying symptoms. A few hours will sometimes suffice for an invasion of attic, antrum and the cells of the mastoid.

Next in virulence is diplococcus intercellularis meningitidis.

The staphylococcus is generally found in company with the streptococcus.

The pneumococcus is more frequently found in purulent otitis media than any of the others, but is not especially virulent. *Campbell.*

The Treatment of Acute Otitis Media.

BEZOLD. Munich. (*Archives of Otology*, Vol. XXXII, No. 1. In the simple acute and perforative otitis media, the objects to be attained are:

1. The morbid products must be completely removed, or their rapid absorption assured.
2. The reinfection of the diseased cavities is to be prevented.
3. Permanent and favorable conditions for drainage.

The first indication is met by the air douche and paracentesis.

In severe grades of inflammation where the tympanum is filled with secretion and the Mt. is bulging, the air-bag is always preceded by paracentesis. To force out the secretion the author employs air douche through the external auditory canal, and the compression is made during the act of swallowing.

Later when the nose and naso-pharynx are practically normal Politzer's method may be employed. After paracentesis and the air douche, a small quantity of boric-acid powder is insufflated by means of a pipette. As long as the mastoid is tender, the ice-bag is applied for hours.

The author employs cotton tips to remove discharge from the auditory canal. The patient frequently repeats Valsalva's experiment, and then by the aid of a mirror the discharge is mopped out. He vigorously protests against the gauze packing of the ear canal, claiming that it encourages putrefaction and is very prone to be followed by complications.

The canal is irrigated once daily with a 4 per cent. boric acid solution.

Campbell.

Chronic Sphenoiditis in Its Relation to Disease of the Middle-Ear.

EMERSON. (*The Laryngoscope*, January, 1903.) An analysis of 268 cases of chronic catarrh of the middle ear. Caries of the sphenoid was found in twenty-five cases, that is 9.3 per cent. Ten more cases are added for analysis. Thirty-two were unilateral, eighteen on the right, fourteen on the left side, two bilateral and one unilateral in doubt. Twenty-two cases were associated with chronic catarrhal,

four with chronic suppurative ears, seven presented catarrhal on one side and chronic suppurative on the other.

The etiology was unsatisfactory, especially trying to trace the influence of influenza, the infectious diseases, etc.

Headache, usually severe was the rule; some also had vertigo. Seven were accompanied by frontal, four supraorbital, two supraorbital and occipital, and one vertex and occipital.

The number of times a drop of pus was observed in the opening of the Eustachian tube emphasized the necessity of careful cleansing of the nasopharynx, and posterior rhinoscopy before the catheterizing as a necessary precaution.

Seymour Oppenheimer.

Remarks on Thrombosis of the Sigmoid Sinus with three new cases.

E. GRUENING (*The Laryngoscope*, January, 1903) calls attention to the anatomic peculiarities of certain temporal bones called dangerous ones in which (a) the sigmoid sinus runs far forward, curves inward and passes over the projecting ledge of bone forming the posterior boundary of the jugular foramen, (b) the jugular bulb rises forward to the floor of the tympanic cavity and lies on a higher plane than the lowest part of the sigmoid sinus; (c) the floor of the tympanic cavity is often as thin as paper.

Three cases of sinus thrombosis are reported in which anatomic peculiarities of the temporal bone existed.

Seymour Oppenheimer.

On the Value of Electrolysis in the Eustachian Tube

NORVAL H. PIERCE. (*The Laryngoscope*, January, 1903.) The writer concludes that in otosclerotic disease electrolysis is useless; in the great majority of cases of catarrhal disease it has no advantage over other methods of treatment, in a certain few cases where there is probably a soft exudate near the isthmus, it may be regarded as of some value.

Seymour Oppenheimer.

A Piece of Bougie in the Eustachian Tube.

J. O. Tansley (*The Laryngoscope*, January, 1903.)

A case is reported of a patient who had undergone a course of treatment for middle ear catarrh and a stricture of the eustachian tube without success.

The patient subsequently consulted the writer who found a body in the Eustachian orifice—the bulbous end of an electrolysis probe about three-fourths of an inch long which he withdrew.

Electrolysis in these conditions is condemned.

Seymour Openheimer.

II.—NOSE AND NASO-PHARYNX.**Hay Fever.**

A. THOST (*Münchener Med. Wochenschrift*, 1902, No. 17,) has worked up 400 cases of hay fever to which he had access, with the aid of a schedule of questions. Three factors co-operate for the production of the disease—an external cause, a local one and a general diathesis. The external cause comprises, in addition to the pollen of flowering grasses, other dust and gas generating substances. The importance of the vegetation lies in the occurrence of the attacks at a fixed time, in the South much earlier than in the North. The local diathesis manifests itself in the presence of a catarrhal swelling of the nose, as is often found in weakened individuals. The general predisposition consists in a neuro-pathic state. The better classes are far more often attacked. No age is free, but the cases decline in number with the more advanced years. Overexertion and excitations are regarded as causes. Then come infective diseases, especially influenza. Gout does not enter into consideration. Heredity is perhaps often present.

Levy.

The Pathology and Therapy of Frontal and Ethmoidal Sinusites and Their Orbital Complications.

AXENFELD. (*Deutsche Med. Wochensch.*, 1902, 40.) Orbital phlegmon results usually from conditions in the nose or accessory sinuses. The primary focus may not be demon-

strable at the time of the operation. In acute cases the opening of the accessory sinus is not absolutely necessary, since these can heal spontaneously, but the orbital abscess must be evacuated. If it is desired to open the frontal sinus secondarily, in order to prevent infection, it is necessary to open from the forehead inward. In one of the author's cases, while opening a suppurating frontal sinus, the healthy frontal sinus was opened, without an infection of the latter following.

Levy.

Rhinitis Fibrinosa, Crouposa S. Pseudomembranosa.

J. MOELLER. (*Hospitalstidende*, 39, 1902.) The history of two patients suffering with rhinitis crouposa is given; in one diphtheria bacilli by inoculation were found, in the other Fraenkel's pneumococcus.

After the author had discussed the diagnosis, etiology and treatment of the disease with reference to the extensive literature on the subject, he summed up as follows: The chief point in the clinical picture consists in the occurrence in the nasal cavities of a pseudomembrane which does not arise in connection with a synchronous diphtheria or after an operation. The disease is acute and is recognized by a severe watery discharge and increasing obstruction of one or both nasal passages. The obstruction increases until it is complete, whereupon an expulsion of the membrane follows.

The great majority of cases appear in children; the course is exceptionally mild; there is usually no disturbance of the general health; there is usually no tendency to extend itself beyond the limit of the nasal cavities and in the course of some weeks it disappears with restitutio ad integrum. The disease can occur in different ways; by infection with different bacteria during a simultaneous action of other etiologic factors in the nasal mucous membrane; in the great majority of cases it is caused by diphtheria bacilli, which are sometimes contagious.

Fischer.

Recurring Multiple Angiomata of the Septum.

JOHN O. McREYNOLDS, Dallas, Texas. (*Jour. Amer. Med. Assn.*, Mar. 7, 1903.) In the case reported there are a number of dark blue elevations of the size of a pea, situated on each side of the cartilaginous septum, most numerous anteriorly, and composed almost entirely of blood vessels of the

venous type. On the very slightest provocation these little blood tumors break, and without any discoverable reason they will bleed furiously for an hour or more, until the loss of blood is at times very great. Aside from this the patient is not a bleeder.

The most successful treatment has been the use of the electric cautery for the complete destruction of the tumors. Up to the time of the report they have been recurring every few weeks. Electrolysis has of late given better results than the electric cautery.

Richards.

Contribution to the Pathologic Histology of Syphilitic Ethmoiditis.

J. L. GOODALE, Boston. (*Jour. Amer. Med. Assn.*, Mar. 7, 1903.) "The tissue changes consist essentially in a proliferative periostitis, with a new formation of bone in the form of irregular excrescences, in association with a proliferation of the connective tissue in the vicinity and of the endothelial cells of the arteries, leaving in places an obstruction of their lumen. These changes partake of the character of a granulation tumor rather than of a gumma, and are to be referred to the class of syphilitic new growths termed syphiloma."

Richards.

Acute Sinusitis.

J. A. Stucky, Lexington, Ky. (*Jour. Amer. Med. Assoc.*, Feb. 21, 1903.) Dr. Stucky finds the hot nasal douche used twice daily, with either hot normal saline or Seiler's solution one-half strength, to keep the nasal passages clean and to be very soothing and grateful. Where the passages are occluded a small quantity of the following solution sprayed into the nostrils every two to four hours is effective and rapid in action.

Sodium chlorid,	5 gr.
Resorcin,	5 gr.
Adrenalin sol. (1-1,000)	1 dr.
Aqua,	7 dr.

He does not advocate the use of cocain or opiates, on account of their unpleasant reaction. Special attention is to be given to the systemic conditions. When the anterior end of the middle turbinal is swollen and occludes the natural outlet of the sinus, its removal is indicated.

Richards.

The Prophylaxis of Sinus Disease.

D. BRYSON DELEVAN, New York. (*Jour. Amer. Med. Ass'n.*, February 21. 1903.) The importance of severe coryzas should be recognized, and the utmost done from the moment of the onset of the trouble to prevent its extension and involvement of the sinuses. The pernicious practice of allowing a cold in the head to run its course is probably responsible for large numbers of cases of chronic sinus disease.

Treatment should be non-irritating, consisting of cleansing solutions, followed with the application of mild solutions of cocain and adrenalin to the sinus outlets. *Richards.*

Sarcoma of the Nares and Ethmoid Cells.

JOSEPH S. GIBB, Philadelphia. (*American Medicine*, November 1. 1902). The case reported was a woman 38 years of age, who had had what were apparently mucous polypi removed at varying intervals over several years. Microscopically the diagnosis had been mucous polypi. Later, however, there became narrowing of the middle turbinate; the masses seemed to change in color; spontaneous attacks of epistaxis of an alarming character appeared; there was bulging of the intranasal mass within the ethmoid cells; the orbital cavities were encroached upon; all the clinical evidences of sarcoma appeared; and the growth finally burst through the orbit.

As a result of his investigations, the author believes that any surgical treatment of malignant disease in this locality, that is any way short of absolute removal, is contraindicated; and that intranasal measures by means of the snare, forceps and curette, rarely effect much permanent good and run the risk of stimulating the process to increased activity.

Richards.

Polypi in the Nasal Accessory Cavities.

A. R. SOLENBERGER, Colorado Springs, Col. (*Philadelphia Medical Journal*, December 20, 1902.) It is not possible in every case to state whether nasal polypi originate in the bone or in the mucous membrane. Caries is the usual cause of their recurrence, and the diseased tissue usually extends beyond the point where the surgeon may invade with curette and gouge. Every means should be taken to ascertain

whether or not there is caries beyond the pus and polypi or in any of the remotest of the labyrinthian recesses of the nose.

Four cases of polypi in the maxillary antrum and one in the sphenoidal cavity are reported. *Richards.*

A Nasopharyngeal Tumor, with Exhibition of Patient.

G. HUDSON MAKUEN, Philadelphia. (*American Medicine*, November 22, 1902.) The tumor was so situated as to almost entirely occlude the left nostril and partially occlude the right; and in the rhinoscopic mirror it had the appearance of filling the vault of the pharynx. It was attached to the vault in the region of the pharyngeal tonsil. It was an edematous, fibromatous growth, crossed by stratified epithelium. Various attempts had been made to remove it with the cold wire snare, and in each instance copious hemorrhages had been the result, and several wires had been broken. With the aid of No. 10 silver wire a small portion of it was removed. Severe hemorrhage followed. The growth has not yet been entirely removed. *Richards.*

The Anatomy of the Operation of Reaching the Ethmoid Cells Through the Antrum.

HARRIS PEYTON MOSHER, Boston. (*American Journal of the Medical Sciences*, November, 1902.) This paper is a study of the applied anatomy of the operation of reaching the ethmoid cells through the antrum, and is accompanied with illustrative drawings.

The antrum having been opened from without, a curette entered through the ostium and inclined toward the septum and carried back in this incision, would strike first the ethmoid bulla, with the rest of the middle ethmoid cells, then the posterior cells, and finally the anterior wall of the sphenoid. In this region there is a working space of about one-half inch from above downward.

In combined empyemata of the antrum and middle and posterior ethmoid cells, this route should give good results, but it is not adapted to frontal sinus trouble, except in cases in which the frontal suppuration is secondary to suppuration in the ethmoid region.

Richards,

The Operative Treatment of Malignant Growths in the Upper Portions of the Nasal Cavities.

E. J. MOURE (*Journal de Medicine de Bordeaux*, June 29, 1902), discusses the removal of malignant tumors of the nasal cavities, through the natural orifices, and reports a case of epithelioma of the perpendicular plate of the ethmoid, removed through the nasal opening. Repeated recurrences followed, and were removed, the total duration of the affection being 3 years, 5 months.

Of the cases of malignant disease of the upper portion of the nasal cavities, the author recommends the following mode of procedure. Division of the skin of the nose in the median line from above downward, laying bare the bone, excision of the nasal bone, and a portion of the nasal process and of the frontal bone and of the superior maxillary of the corresponding side, thus laying bare the ethmoid cells which may readily be removed. Hemorrhage is considerable but may be controlled by tampons. It is desirable first to tampon the posterior nares. The author reports a case of epithelioma of the ethmoid cells, operated upon by this manner, whose general condition 11 months after the operation was excellent.

Goodale.

Typhoid Naso-Pharyngitis Due to Eberth's Bacillus.

GALLAIS, Courcoux and Decovert (*Le Bulletin Medical*, November 29, 1902), have studied 5 cases of naso-pharyngitis, in two of which they were able to find Eberth's bacillus. This discovery leads the writers to discuss the question of prophylaxis in cases of naso-pharyngitis, particularly when occurring in the vicinity of typhoid patients.

Goodale.

Treatment of Atrophic Rhinitis by Submucous Injections of Paraffin.

CARLES. (*Journal de Medicine de Bordeaux*, July 27, 1902) has employed in 10 cases of atrophic rhinitis, interstitial injections of paraffin into the lower turbinates. He uses paraffin, melting at 60 degrees centigrade, and introduces it in one or several injections into the erectile tissue. This brings about immediately an artificial hypertrophy resembling that of the natural swelling of the mucous membrane. During the following days, without other therapeu-

tic intervention, the crusts and the odor disappear totally.

Goodale.

The Diseased Middle Turbinate.

CHARLES H. BAKER, Bay City, Mich. (*Jour. Amer. Med. Assn.*, Mar. 14, 1903.) The author advocates the removal of the middle turbinate in all cases of recurrent polypus of the middle turbinal itself; in all cases when removal of polypus opens and reveals collections of pus issuing from the sinuses, and in cases when by pressure the enlarged turbinate causes reflex nervous ailments, such as muscular asthenopia, persistent headache, chorea or epilepsy and especially asthma.

Richards.

Digestive Disturbances in Diseases of the Nose and Rhinopharynx.

LANDOLT. (*Gazette Hebdomadaire de Medicine et de Chirurgie*, October 9, 1902.) Disease of the nose and pharynx constitutes a serious danger to the whole system, and may be accompanied by digestive difficulties, due to the swallowing of products of pathologic secretion. The mucus, pus, or crusts coming from the nasal cavities, or from the naso-pharynx, may produce in the stomach two distinct series of disorders: First, dyspepsia, due to the neutralizing of the hydrochloric acid of the gastric juice, causing digestion to cease, and leaving the field open for different fermentations, such as lactic, butyric, etc. Second, septic gastritis, due to the same pathogenic organisms which produced the original nasal or pharyngeal diseases. Treatment of gastric disorders should therefore be preceded or accompanied by appropriate measures directed to any accompanying nasal or naso-pharyngeal affection.

Goodale.

A Case of Myxo-Sarcoma in the Nasal Cavity.

MAYO COLLIER (*Jour. of Laryng., Rhin. and Otol.*, Jan. 1903) showed the case of a man, aged fifty-nine, who presented himself at the North-West London Hospital complaining of complete obstruction in the left nostril, extending over a period of three months. There had been no pain and no bleeding, but a glutinous discharge was constant from the left side of the nose.

An examination revealed a soft gelatinous growth, appar-

ently springing from the lower turbinal body, and which bled at the lightest touch.

An attempt was made to remove this, as well as the whole lower turbinal body. After removal of the lower turbinal body, it was found that the growth extended to the roof of the nose and invaded the vault of the pharynx.

A Case of Extreme Displacement of the Nose.

MAYO COLLIER. (*Jour. of Laryng., Rhin. and Otol.*, Jan., 1903.) This case was one of considerable interest, an operation having in the main corrected the deformity and afforded ample breathing space.

The dislocation of the nose was extreme, the tip being under the right eye. The left nostril had been occluded for fourteen years, and very little air entered the right. The septum was pushed over to the left side, and literally lined the outer wall of the left nasal fossa. The right cavity was correspondingly enlarged, and a very large lower turbinal body occupied the concavity of the septum. A fine keyhole saw was forced into the lower meatus, and the ridge of the maxillary and palate bones divided and removed. The vertical plate of the ethmoid bone was then fractured and pushed over to the opposite side. Some of the cartilaginous septum was removed.

The result was, so far, all that could be wished—a nearly straight nose and ample nasal respiration. No splints or supports of any kind were used.

Case of Vascular Naso-pharyngeal Fibroma of Extensive Origin Finally Removed by a Combined Operation Through the Soft and Hard Palate, and Extensive Removal of Anterior Wall of Left Supramaxillary Bone.

HERBERT TILLEY. (*Jour. of Laryng., Rhin. and Otol.*, Jan., 1903.) F. S—, male aged fourteen, came to the hospital November 19, 1901, complaining of complete nasal obstruction associated with a blood-stained discharge from the left nostril, of five months' duration. For the last three weeks the discharge had been offensive, and for seven or eight weeks the right nostril had been completely occluded. It was noticed that the patient was weak and anemic. The lower half of the nose was much broadened, and the left nostril distended by a gray sloughing mass, which bled

freely when touched by a probe. The discharge from the left nostril was very offensive, while the right was completely occluded by marked deviation of the nasal septum. By posterior rhinoscopy the left choana was seen to be filled by a reddish mass, which passed insensibly on to the mucous membrane of the naso-pharynx. Digital examination revealed a smooth-surfaced elastic swelling, which seemed to spring from the basi-sphenoidal and ethmoidal regions. There was no displacement of the left eye. Transillumination showed opacity of the left antrum.

First Operation, November 20, 1901.—Having made an inverted U-shaped incision over the sides and root of the nose, the nasal bones were divided in the line of incision with a saw, and the nose turned downward on the face. This brought the growth well into view, and procured easy access to the ethmoidal region. The growth was seized in strong forceps, and some half of it torn and cut away, but it was soon obvious that the base of the tumor was too extensive for removal through the opening. The hemorrhage was very profuse, and could only be kept in check by compressed marine sponges forced into the nasal cavity. Respiratory difficulties arose owing to blood escaping into the larynx, in spite of the post-nasal space having been plugged.

The nose was finally replaced and sutured in position; it healed by immediate union. Dr. Horne reported the growth to be an angeio-fibroma, and free from any elements of malignancy. The iodoform gauze packing which was used to plug the nasal cavity at the end of the operation was removed through the nostril in forty-eight hours. The patient made a rapid recovery from the shock of the operation, and three weeks later it was determined to attempt the removal of the growth by a different method.

Second Operation, December 7, 1901.—Having inserted a laryngotomy tube, and placed a sponge above the larynx, a Whitehead's gag was employed to keep open the mouth. With the patient's head hanging slightly backward over the end of the table, the soft palate was completely divided in the middle line, the incision being carried forward to the alveolar border, immediately behind the incisor teeth. The mucous membrane was stripped from the left half of the hard

palate, and the latter completely removed by chisel and mallet. The growth was thus brought fully into view, and its base was seen to be attached to the left basi-sphenoidal and ethmoidal regions. Its base was seized in an ovariectomy clamp, and the greater part of the growth removed by scissors. Other smaller portions were removed by means of strong wire snares and cutting forceps. The hemorrhage was free, but under good control, and it was checked by marine sponges on holders. As far as the eye and finger could ascertain, all the tumor was removed. The patient, although only thirty-five minutes under the anesthetic, had at the end of the operation a weak, rapid and intermittent pulse, which quickly recovered under the influence of a rectal injection of $1\frac{1}{2}$ ounces of brandy, and strychnin, 1-30 grain, administered hypodermically.

The long strip of iodoform gauze which was packed into the naso-pharynx at the end of the operation was removed in forty-eight hours, and the nasal cavity subsequently irrigated three times daily with a warm alkaline wash.

The patient made a rapid recovery; but after an interval of three weeks the growth was seen to be recurring, and in the course of six to eight weeks it was obvious that further intervention would be required.

March 15, 1902.—A third operation, identical in all details with the last, was carried out, but possibly a more thorough clearance of the growth was made.

A month later recurrence was visible in the region of the middle meatus, and every week during the months of May, June and July the patient attended as an out-patient, the treatment consisting of piercing the growth in many places with the galvano-cautery. This seemed at first to retard its growth, and produced a number of puckered scars, but latterly it became obvious that the growth was increasing in size. Toward the end of July it projected through the cleft of the palate, and nasal obstruction again became complete. The lad was anxious that yet another attempt should be made to eradicate the growth, a request which received some encouragement from the report of the pathologist—viz., that there were no signs of malignancy in the piece of tumor which he had examined. Since the recurrence seemed to spring

from the middle meatal region, and the left antrum was very opaque on transillumination, it was decided to explore that cavity.

July 31, 1902.—With the preliminaries as in the preceding operations, an incision was made in the gingivo-labial furrow from the level of the left molar tooth across the middle line to the corresponding position on the right side. The cartilage of the nasal septum was divided along its floor by strong scissors, and the nose and soft parts of the face on the left side turned upward, so as to fully expose the anterior surface of the left maxillary bone. The front wall of this was then completely removed, and the antral cavity found to be filled with the growth, which was very vascular and firmly attached to the whole of the posterior and upper walls. To gain more room the lower half of the ascending (nasal) process of the maxillary bone was removed by means of strong bone forceps. The portion of the growth extending into the mouth was then removed by a strong wire snare; the remainder was seized in a pair of powerful tonsil forceps and torn away from its attachments, leaving completely bare the left side of the basi-sphenoidal, ethmoidal, and maxillary antral regions. Hemorrhage was checked by means of marine sponges. The after-treatment consisted of syringing out the nose and left antrum three times daily for three weeks with warm boracic lotion.

The patient made a rapid recovery, and left the hospital fourteen days after the operation. At the present moment (November 7) there is no sign of recurrence, no nasal discharge, the parts appear perfectly healthy, and the patient is in robust health, having grown two inches since the first removal of the growth. It now only remains to close the cleft in the soft palate.

A Readily-Improved working Model to Demonstrate the Air Channels and Currents in the Nasal Cavities in Normal and Impeded Nasal Respiration.

SCANES SPICER. (*Jour. Laryng., Rhin. and Otol.*, Jan. 1903.) This apparatus had been contrived from objects which would probably be in the possession of most rhinologists. It consisted of a Betz plaster model of the half-head as seen on medial sagittal section, the septum nasi having

been removed; a soft, flexible, perforated metal Asch's tube splint; 12 inches of India rubber tubing (five-eighths inch in diameter); some plasticine modelling composition; and a sheet of clear glass 10 by 8 inches. The flexible metal tube was moulded to represent accurately the form and dimensions of the vestibule and rima naris, and then puddled on to the alar region of the plaster model with plasticine; the rubber tubing was similarly affixed to the lower end of the pharynx of the model. A cord of plasticine one-third inch in diameter was then accurately affixed to the margins of the nasal and naso-pharyngeal cavities of the model, and the sheet of glass pressed down so as to allow no leak anywhere. The model was now filled with smoke from a cigarette through the rubber tube.

On inspiring or expiring air through the rubber tube, the passage of the entering or out-going current of air through the dense smoke could be easily traced. The normal inspiratory current in quiet breathing is seen to issue from the rima and spread out like a fan to impinge on the front part of the middle turbinated body and adjacent parts. It then sweeps rapidly round the roof of the nose and naso-pharynx, passing chiefly through the upper two-thirds of the nasal cavity. A vortex is also seen to be formed by a current becoming detached from the main stream just in front of the posterior nares which impinges downward and forward on to the floor of the nose, and then curls round the front end of the inferior turbinated body. The inspiratory current does not normally pass through the inferior meatus.

The normal expiratory current in quiet breathing passes chiefly through the lower two meatuses, and a vortex is formed in the fore part of the nasal cavity in a reverse direction to that of the preceding.

The glass can be removed, and any pathologic condition, such as spurs, deflections, polypi, adenoids, etc., can be represented in size and position by lumps of plasticine; and on replacing the glass as before their effects in diverting the normal currents could be easily studied and the conditions varied.

Mr. Spicer thought it might with reason be objected that the anatomic conditions were not exactly reproduced, and

that the ala did not move as in normal respiration; but the approximation must be fairly accurate, for it was remarkable how the results agreed with Paulsen's and Franke's researches on the cadaver, and Parker's deductions from his lycopodium powder experiments.

The full results of observations made would be deferred for a future communication, but in the meantime, considering how readily the apparatus could be arranged and worked, doubtless many rhinologists would test it and compare the results with their previous ideas on the subject.

Left Antral Empyema, Followed by Abscess of Hard Palate and of Septum Nasi.

HUNTER TOD. (*Jour. Laryng., Rhin. and Otol.*, Jan. 1903.) The patient was a medical student, who three months ago had a severe attack of toothache on the left side, followed, on the second day after the onset, by swelling of the face, and on the fourth day of the hard palate on the same side also. On the sixth day an abscess of the palate had burst into the mouth; at the same time he had noticed the nose had become swollen and obstructed. Two weeks after onset a dentist extracted the second incisor, canine, and first bicuspid teeth. The swelling of the face gradually diminished. Mr. Tod saw him three days later. He then had an obvious abscess of the septum, which blocked both anterior and posterior nares. The left antrum was dark on transillumination. The abscess of the septum was incised; much offensive pus escaped, and the nose was kept clean by a simple wash. A month later the nose appeared healthy but for great thickening of the septum, seen by posterior rhinoscopy, and there was a drop of pus in the middle meatus of the left side of the nose. The second molar was extracted, and the antrum, which contained much pus, was drained through the alveolar arch. The patient was now practically well. There was no necrosis of bone and no perforation of the septum.

Double Antral and Frontal Sinus Disease; Left Side Cured by Radical Operation; Question of Operation on the Left Side.

HUNTER TOD. (*Jour. Laryng., Rhin. and Otol.*, Jan. 1903.) The trouble in this case probably dated from an attack of influenza in 1897, since which the patient had suf-

ferred from headaches, gradually increasing in severity, and had noticed much purulent discharge from right side of the nose. The headaches had incapacitated him from working since onset.

About Christmas, 1901, there was an abscess over the left eye. This was scraped twice at a provincial hospital. On admission to the London Hospital the left eye was nearly closed from edema and infiltration of the supra-orbital tissues, and there was a tiny fistula leading into the frontal sinus. The nasal cavity on that side was normal. The right side was filled with polypi, and there was much pus. The anterior half of the right middle turbinate and the polypi were removed. A week later, after cleansing the nose, the antrum was explored with a fine trocar; it contained pus. Similarly, a cannula was passed into the fronto-nasal duct, and pus was washed out of the frontal sinus. Exploration of the left antrum proved it full of pus, although the nasal cavity appeared normal.

A radical operation, consisting of removal of all anterior and inferior wall of the left frontal sinus, which was filled with polypi and pus, was performed, and a passage made into the nose. The patient was practically well on the seventh day, and left the hospital on the tenth. A tube was worn in the fronto-nasal duct for two months. Since then there had been no recurrence.

The antra were drained through the alveolar arch. The left side was now cured. There was still pus in the right frontal and antral sinuses, proved by repeated washing out of the sinuses. The patient, however, since the operation on the frontal sinus, had had no further headache, and felt and looked well. He had not been seen for two months before being shown to the Society. He had now so greatly improved that the question of operation on the right side hardly arose. There was considerable flattening over the right frontal sinus, but to this the patient did not object.

**Case of Laryngitis Hypertrophica following
Prolonged Nasal Trouble.**

HUNTER TOD. (*Jour. Laryng. Rhin. and Otol.*, Feb., 1903.) The patient had suffered from nasal obstruction, due to continuous nasal catarrh, for five years. For the last

four years she had been hoarse, and had been troubled with a severe cough and continued hawking up of mucous secretion from the throat.

She came to the London Hospital three months ago, and was found to have marked hypertrophic rhinitis, with much muco-pus trickling down the pharynx into the larynx. The larynx showed marked hypertrophy of the interarytenoid region, and also of the vocal cords, which latter were very thick, irregular, and of a red, beefy appearance, and there was considerable muco-purulent secretion to be seen.

The nose was first treated, the hypertrophic tissue being removed by the snare. The nose and pharynx were practically normal; there was no longer any nasal obstruction, and no muco-purulent secretion in the pharynx.

Collodium After Nose Operations.

PISCHEL, San Francisco. (*Archives of Otolaryngology*, Vol. XXXI. No. 5.) After operation, bleeding is stopped by adrenal solution, then with a metal tube, e. g., a Eustachian catheter, to one end of which is fastened a rubber bulb, collodium is dropped steadily on the wound while an assistant blows compressed air into the nose to quicken evaporation. Occasionally a wisp of cotton is placed on the wound first, to increase the power of the collodium. The author removes this membrane in a few days to avoid infection by retention.

Campbell

III.—MOUTH AND PHARYNX.

The Degenerate Tonsil.

EDWIN PYNCHON, Chicago. (*Jour. Amer. Med. Assoc.*, Mar. 21, 1903.) Dr. Pynchon's operation consists in the dissection out of the entire tonsil with the electrocautery. This operation gives a practically bloodless field, so that all the diseased tonsillar tissue can be cleanly removed. It can be done under local anesthesia. The operator has employed it more than 1,000 times, and finds that as a rule the tonsil peels out with facility and often bloodlessly. The results have been ideal and have generally yielded a throat with fauces pink, with mobile and approximating pillars, one in

which in the case of vocalists a high register has been enhanced by two or three notes, and in which the tonsillar region is never afterward the source of pain or discomfort to the patient. *Richards.*

The Local Pathology of Acute General Infection Arising Through the Lymphoid Tissue of the Fauces.

J. L. GOODALE, Boston. (*Boston Medical and Surgical Journal*, Sept. 25, 1902.) As a result of his own experiments the author does not regard the tonsils as protective organs in the sense of themselves producing phagocytic leucocytes, but rather as representing unusually open channels of communication between the interior of the organism and its exterior, along which polynuclear leucocytes make their way from the blood vessels to the surface of the mucous membrane.

Longitudinal sections of crypts showed the largest number of bacteria near the orifice, in both acute and chronic inflammations. The polynuclear leucocytes probably restrict the development of the bacteria in crypts.

As a rule, in acute inflammation of the tonsils, the result of infectious micro-organisms is to form local abscesses in the crypts, which discharge their contents through the crypts. At times, however, these intrafollicular abscesses discharge into the efferent lymph channels, and such cases may form the beginning of a circumtonsillar abscess.

Acute infectious bacteria multiply in the tonsillar tissue proper, but only when a penetration has been effected into the germ centres of follicles. Experiments lead us to assume with reasonable probability that these micro-organisms may be carried beyond the capsule of the tonsil into the adjacent lymph glands, there producing acute suppurative inflammation. If the intrafollicular abscess should discharge into the veins, the condition present would be adequate for the production of a general septicemic infection. *Richards.*

Lichen Planus of the Tongue.

At a meeting of the Societe Francaise de dermatologie et de syphiligraphie, Balzer (*Bulletin Medical*, December 13, 1902), presented a case of this affection, the diagnosis of which was facilitated by other characteristic lesions on the skin. In the discussion, Darier said that lichen planus of the tongue may occur in three different forms; first the

form *en nappe*, second a form where there exists simultaneously these smooth lesions and papules, rising from the surface.

The third variety is characterized by the arrangement of white spots to form a network.

Fournier said that this case of lichen resembled the ordinary leucoplakia, and that it was probably similar occurrences which led to the reports of the so-called cure of leucoplakia. This latter disease is not curable, while lichen planus is. Barthelemy disagreed with Fournier, since in his experience, leucoplakia might be cured and he cited two cases. Fournier in reply said that syphilitic leucoplakia might be cured, but that the true leucoplakia which manifested itself by the formation of ridges on the surface of the tongue was incurable.

Goodale.

Pseudo-Membranous Angina due to Syphilis.

G. BELLAN (*Gazette Hebdomadaire de Medicine et de Chirurgie*, October 23, 1902), discusses a form of pseudo-membranous angina occurring in secondary syphilis, particularly in those individuals who have been previously subject to recurrent attacks of tonsillitis. Clinically they are distinguished by the long duration of the dysphagia, the absence of fetid odor in the breath, and the existence of an ulceration below the false membrane.

Goodale.

Fetor ex Ore Gastro-Intestinalis.

ROSENHEIM. (*Therapie der Gegenwart*, Nov. 1902.) The most frequent causes are diseases of the mouth, teeth, tonsil, throat, and nose. In uremia there is the smell of trimethylamine; in the cystitis of prostatic patients there is a very offensive smell. Often the cause is an affection of the alimentary canal such as carcinoma, ectasia and stricture. Affections of the stomach usually indirectly cause a fetor ex ore by causing diseases of the mouth; directly, they cause it very seldom, viz., by eructations of gaseous decomposition products. This occurs most frequently in carcinoma and dilatation of the stomach. Disagreeable gases are absorbed by the gastric mucous membrane and thrown off by expiration. This is undoubtedly the case in intestinal affections. It is an almost constant symptom of carcinoma of the large intestine, in advanced stages often in

acute and chronic constipation, on the other hand also in diarrheic conditions, dysentery, tuberculosis, typhoid fever. Even in scarcely perceptible gastric affection, the fetor ex ore can be very offensive. The cause is the decomposition of the albuminous food products. A milk and vegetable diet is beneficial in these cases. Likewise regulation of the bowels is important. Menthol taken internally acts antiseptically.

Levy.

The Recognition of Chronic Pharyngeal Diphtheria.

NEISSER. (*Deutsch. Med. Wochens.*, 1902, 40.) As a supplement to previous communications, the author reports a case of multiple diphththeria in a family. The source of infection was found to be a house girl, in whose throat were large numbers of diphtheria bacilli. Objectively, the typical picture of atrophic pharyngitis was found. In spite of long continued treatment, it was impossible to make the bacilli disappear. Her blood was found to be very antitoxic.

Levy.

Granular Pharyngitis.

E. J. MOURE. (*Journal de Medicine de Bordeaux*, March 16, 1902.) Secondary granular pharyngitis may be due to naso-pharyngeal inflammations, to sinusitis, to recurrent attacks of colds in the head, to nasal polypi, spurs or deviations of the septum, in short, any lesion which compels the patient to breathe chiefly through the mouth. True idiopathic granular pharyngitis, on the other hand, is observed particularly in those individuals who make excessive use of the voice, or are exposed from their occupations or habits to frequent attacks of acute pharyngitis. Two forms are observed, the first so-called exudative form, where the mucous membrane is thin and smooth, but diffusely reddened and elevated, and traversed by dilated and sinuous vessels. In the second form the pharyngeal wall is studded with a series of reddish granulations, more or less confluent, even appearing as an irregular prominence, situated behind the posterior pillars. From the point of view of diagnosis and treatment, it is important to determine which form is present. Where the condition is dependent upon other abnormalities either local or general appropriate treatment to these should be

given first. The following prescription may be applied to the posterior pharyngeal wall, once or twice a week:

R	Iodin Crystals	25.
	Iodid of Potassium	30.
	Tr. Opii.	3.
	Glycerine	120.

In other cases, tincture of guaiacum gives excellent results, and may be prescribed as follows:

R	Sod bibor	6.
	Antipyrin	4.
	Tr. Guaiac	5.
	Mentholated Alcohol	5.
	Glycerine	140.

M. S. Teaspoonful in a glass of water to be used as a gargle. *Goodale.*

Case of Complete Adhesion of Soft Palate to Posterior Wall of Pharynx.

LAMBERT LACK. (*Jour. of Laryng., Rhin. and Otol.*, Jan., 1903.) The patient was a woman aged about thirty. There was complete union between the soft palate and posterior pharyngeal wall; not even the finest probe could be passed up from the mouth into the naso-pharynx. This was evidently the result of tertiary syphilis, although it was the only lesion, and there was no active disease. The patient had trouble in swallowing at times, occasional shooting pain in the ear, but not severe, and much mucus collected in the post-nasal space and had to be syringed away through the nose.

IV.—LARYNX.

Some Cases of Spasm of the Glottis and Convulsions in Children Whose Cure Was Accomplished By Removal of Adenoid Vegetations.

MAALOC, Copenhagen. (*Hospitalstidende*, 29, 1902.) The author reports the histories of 10 patients, ranging in ages from 10 weeks to 3 and 3-4 years; 4 of them suffered from pure spasmus glottidis, 6 from spasmus glottidis complicated with convulsions, or perhaps from convulsions alone. In all the cure was accomplished by removal of the vegetations.

The period of observation extended over 1 to 4 years. One child of 9 months showed especially well the relationship between the adenoid vegetations and the convulsions; the latter reappeared as soon as the vegetations returned, and did not completely disappear until they were removed. The author recognizes no contraindication to the operation on so small children, though without doubt such may present.

Fischer.

Laryngeal Symptoms Complicating a Case of Purpura Hemorrhagica.

JOSEPH S. GIBB, Philadelphia. (*American Medicine*, Oct., 18, 1902.) During the progress of the purpura, symptoms of laryngeal obstruction appeared the lumen of the larynx was much diminished and the landmarks obliterated. The sub-mucous tissues were much distended, presenting the same appearance as in cases of edema. The mucous membrane was pale red. In the second examination an attempt was made to reduce the swelling, an application of ten per cent. cocain being first made, followed by 1-1,000 adrenalin. The patient was much relieved, and examination of the larynx afterward revealed a marked diminution of the swelling and an increase of breathing space.

This application was made at 5 p. m. At 9 p. m., of the same day, there was a return of the symptoms of laryngeal cyanosis, the patient growing rapidly worse and dying four hours later.

The author queries as to whether the adrenalin had any influence in causing the unfavorable symptoms.

Richards.

Low Lateral Pharyngotomy, for Approach to the Lower Portion of the Pharynx, Upper Portion of the Esophagus and Posterior Surface of the Larynx, With an Illustrative Case.

JOSEPH D. BYRANT, New York. (*Journal of the Amer. Med Ass'n.*, Oct. 18, 1902.) The operation was done for a tumor in the lower pharynx. Chloroform was administered and preliminary tracheotomy first done.

Incision was made on the right side from a point one inch below the body of the jaw, in a line corresponding to the thyroid cartilage, through the integument, superficial fascia

and platysma, to a point a little below the cricoid cartilage. The borders of the incision were held apart by traction loops, and the left greater cornu of the hyoid bone was pressed to right, bringing into prominence the right greater cornu, which was seized with a tenaculum and drawn firmly upward and held. By so doing the open space below was increased, the cornu was immobilized, and the inferior constrictor at the floor of the incision made prominent. Careful examination of the floor of the operative field disclosed the external laryngeal nerve lying quite vertically along the inferior constrictor, with the superior thyroid vein lying transversely somewhat higher up. The nerve was raised and laid aside, while the vein was tied between two ligatures and pushed aside. A half-inch incision was made through the thyrohyoid membrane, below the greater horn, avoiding the internal branch of the laryngeal nerve and the attendant artery, and into the pharynx.

The tumor was located posteriorly to the larynx and firmly attached to it. The tumor was next enucleated, leaving behind its membranous envelope. The growth was adherent to the right ala of the thyroid, through which it was removed with difficulty. The opening into the pharynx was closed with two rows of fine interrupted chromicized catgut sutures. "The superimposed structures were closed successively by buried catgut and superficial silkworm-gut sutures. A textile fabric drainage agent was introduced into the sac after the removal of the tumor, and the remaining portion of the external wound was lightly packed with gauze. The sac was treated by drainage and gentle washing. In a few instances fluid passed into the larynx and into the pharynx, but the sac rapidly became obliterated, and the external wound closed at the end of 19 days.

Patient was nourished by the bowel for the first three days; after this time fluid alimentation was given by the mouth till the end of a week, when a mixed diet was given.

The tumor weighed 425 grains and was fibro-muscular in character.

Richards.

Syphilis of the Larynx.

CHARLES M. ROBERTSON, Chicago. (*Jour. Amer. Med. Assn.*, Jan. 17, 1903.) The edges of the syphilitic laryngeal

ulcer are somewhat elevated, and after wiping away the secretion on the floor, persistent granulations are visible. As distinguished from tubercle this ulceration is larger in size, unilateral, and surrounded by an areola, while tubercular ulcers are usually bilateral, white, and have no areola. The superficial ulcer may appear simultaneously with the mucous patch or at any time from the second to the seventh year after the primary lesion by the breaking down of a superficial gummatous infiltration. The syphilitic ulcer is rarely seen in the stage of induration, its first evidence being as a clear-cut deep ulceration.

In its treatment, the author pushes the iodides to their tolerance, giving 5 to 15 grain doses of bromide of sodium when there is any tendency to iodide poison. This, he states, will often prevent the rash appearing. He starts with 20-grain doses, increasing it 20 grains every two days until tolerance is reached, and gives as high in certain instances as from 100 to 150 grains three times daily. In combination with the iodide treatment inunctions of mercury are given in the shape of blue ointment or the oleate, administered by rubbing a dram into different portions of the body daily, each dose preceded and followed by a warm bath. After the fourth dose the inunction is discontinued for a few days. In case the mercury disturbs the bowels, a small dose of opium may be added.

Richards.

The Diagnosis of Carcinoma of the Larynx.

OTTO T. FREER, Chicago. (*Jour. Amer. Med. Assn.*, Feb, 14, 1903.) All the various factors concerned in the diagnosis of cancer of the larynx are considered at length. The earlier the diagnosis can be made the better the chance for operative interference, as laryngotomies and endolaryngeal operations offer better chances of recovery than laryngectomies.

In removing portions of tissue for microscopic examination, the instrument should be crowded deeply into the growth and the piece taken from the center. The risk of infection or stimulation is not considered by the author as of much account compared with the possibility of the information which may be gained by a prompt and accurate diagnosis, and he does not find mention in the literature of any spe-

cial increase in the gland infection after the test excisions. The positive microscopic test is conclusive if properly performed; that is, with the microtome sections vertically to the surface of the fragment of tumor. A negative result should in most cases lead to further excisions until the diagnosis is certain.

Richards.

Laryngectomy for Carcinoma.

E. FLETCHER INGALS, Chicago. (*Jour. Amer. Med. Assn.*, March 7, 1903.) A case operated on by the late Prof. Christian Fenger is reported, in which complete laryngectomy was done with apparently successful result up to the time of the report.

The later statistics of all of the operations for carcinoma of the larynx are much better than the earlier ones. Out of 188 cases of total laryngectomy operated on between 1873 and 1894, there were 45 per cent. who died as the result of this operation, 32 per cent. of recurrences, and 12.7 per cent. of apparent cures; whereas, from 1890 to 1898, out of 81 cases there were 26 per cent. of apparent cures, 23 per cent. of recurrences, and only 18.5 per cent. of deaths apparently due to the operation. Formerly most of the deaths occurred from aspiration-pneumonia. This is now combated by operating with the hanging head, the use of the tampon canula, and by suturing the stump of the trachea to the skin. The operation is also done in the combined Trendelenburg and Rose's position, and the patient kept in this position for several days. This is the method used by W. W. Keen.

Richards.

The Treatment of Laryngeal Tuberculosis With Reference to the New Remedies.

Dr. TOVOTGYI (*Therapie der Gegenwart*, March, 1902) has tried a large number of the remedies lately recommended for laryngeal tuberculosis. The powder treatment seems to be usually ineffective; at most it was useful as adjuvant. This is true for iodol, iodoform, thioform, xeroform, nosophen. On the other hand, orthoform powder acts very well as an anesthetic. Formalin, 2 to 10 per cent. is valueless. Orthoform oil (25-150 olive oil) paramonochlorphenolglycerin, monochlorphenolglycerin, balsam of Peru, dissolved in colodion, has a weak action. On the other hand phenolum

natrio-sulphuricinicum is of great value especially in infiltrations. In ulcerations lactic acid in strong solution acts better. He saw little good in use of menthol. In every drug there was a stage where the action ceased. They must be alternated with intermissions of no treatment. The author alternates between lactic acid, phenol-sulphuricinicum, orthoform and menthol.

Levg.

A Case of Malignant Growth of the Larynx.

MR. MAYO COLLIER (*Jour. of Laryng., Rhin. and Otol.*, Jan., 1903) said he exhibited this case as an example of how a serious condition may exist in the larynx without giving much trouble or inconvenience.

This man, aged sixty, was admitted into the North-West London Hospital complaining ostensibly of an abscess in the side of the neck opposite the cricoid cartilage.

His voice was hoarse; otherwise he had suffered no inconvenience, and was quite unaware that anything was wrong with his larynx. The abscess was evidently connected with the deep cervical glands which are associated with the laryngeal tissues.

An examination revealed a very large malignant growth almost filling the upper opening of the larynx, and extending into the left hyoid fossa.

Operative procedure, so far as the growth was concerned, being out of the question, tracheotomy was performed in anticipation of the obstruction to respiration that must sooner or later occur. The operation was one of extreme difficulty, owing to the swelling and infiltration of the tissues in front of the trachea. The patient was now quite comfortable with this supplementary opening in the trachea.

A Case of Pachydermia Laryngis.

DR. WYATT WINGRAVE. (*Jour. of Laryng., Rhin. and Otol.*, Jan., 1903.) The patient, a male aged forty, somewhat plethoric in habit, suffered with hoarseness for six months or more. He afforded no evidence or history of syphilis or tubercle, but had always suffered with intermittent nasal obstruction, especially of late.

On examination, the larynx was found to be full of crusts, completely hiding the usual landmarks. These were first softened, and removed with a 10 per cent. solution of sodium

bicarbonate, which revealed a general epithelial thickening of the glottis, especially in the posterior commissure, which presented the usual "cock's comb" projection. The cords moved well. The epithelium gradually increased, giving the cords a "nibbled" appearance, but there was no actual ulceration.

A saturated solution of salicylic acid in alcohol was applied, and followed by a spray of the same dissolved with borax. This course reduced the epithelial deposit at once, and he is now steadily improving after intranasal and general treatment.

A New Growth Occupying the Glottis, and With Destruction of the Epiglottis.

DR. JOBSON HORNE. (*Jour. of Laryng., Rhin. and Otol.*, Jan., 1903.) The patient, a laborer aged fifty-seven, attended at the Metropolitan Ear, Nose and Throat Hospital on account of a "sore throat" of two years' duration, with dysphagia and hoarseness.

On examination, a view of the larynx was obstructed by a growth the size of a small walnut, apparently springing from the right and posterior half. About two-thirds of the epiglottis appeared to be destroyed, and the stump was thickened and nodular. No enlarged gland was palpable. There had been no marked dyspnea, but the patient had recently had some bronchitis. A history of syphilis was not obtainable. Iodide of potassium had been given without effect upon the laryngeal condition.

A Case of Fixation of the Right Vocal Cord.

DR. JOBSON HORNE. (*Jour. of Laryng., Rhin. and Otol.*, Jan., 1903.) The patient, a retired jeweler aged seventy, attended at the Metropolitan Ear, Nose and Throat Hospital on October 11, 1902, on account of a "sore throat" and hoarseness. The history stated that the illness commenced quite suddenly, and was dated from a feeling of suffocation on rising one morning about four months previously. Thoracic pain had been experienced at night. There had been some dysphagia, but the amount of dysphagia complained of had been out of proportion to the loss of flesh that had taken place. He had previously attended at King's College Hospital and at the Central London Throat Hospital.

On examination of the larynx, the right cord was found fixed in the median position, and there was no intrinsic lesion to account for this. An enlarged and hard gland was readily palpable on dipping the finger into the right supra-clavicular fossa close to the sternal notch. The examination of the chest revealed impaired resonance in the second right intercostal space, and behind over the root of the right lung. A full sized esophageal bougie had been easily passed for 17 inches from the teeth.

The patient had not been seen very recently, having been kept from attending at the hospital by a relapse, ushered in by a "fit."

Tertiary Syphilis of the Larynx in a Man Aged Twenty-six.

MR. DE SANTI. (*Jour. of Laryng., Rhin. and Otol.*, Jan. 1903.) The man originally attended Mr. de Santi's Clinic in October, four years ago, with secondary syphilis. At that time the patient had a well-marked rash and the usual ulceration of the tonsils, soft palate and buccal mucous membrane. He also had a hoarse voice, and on examination was found to have a well-marked laryngitis, the latter presenting the usual mottled discoloration of secondary syphilitic laryngitis. He was put upon mercury, and topical applications were made to the larynx. The patient attended irregularly for some nine months, and, although the skin eruption and ulceration of the tonsils soon disappeared, the laryngitis remained obstinate. He had been advised to give up smoking and overuse of the voice, but did not observe these instructions.

The patient was lost sight of until October, 1902, when he again returned to the Westminster Hospital. He stated he had always had a hoarse voice since October, 1898, and that he had been under treatment at various hospitals, especially Golden Square. At the last-named institution he had been under Dr. Powell, who had put him on iodide of potassium, 40 grains, three times a day, and had applied various paints and sprays to the larynx. Dr. Powell had also on six or seven occasions tried to use endolaryngeal forceps.

The patient complained of a hoarse voice, some difficulty in breathing, and slight pain. Examination of the larynx showed both cords ichronically inflamed, especially the left.

On the left cord was a large, firm, red outgrowth or excrescence; in the interarytenoid space was a large swelling which presented cicatricial changes. The cords could not be properly approximated owing to the growth on the left vocal cord.

The patient was brought before the Society on the question of treatment. He had undergone a long course of large doses of iodide of potassium, topical applications to the larynx, and even attempts to remove endolaryngeally some of the outgrowth from the cord, but without any apparent benefit. He now had both pain and difficulty in breathing, and bearing in mind the course these cases of tertiary syphilis of the larynx were apt to follow, the question arose as to the advisability of performing a thyrotomy, and removing the diseased intralaryngeal area.

Case of Removal of the Epiglottis for Tuberculous Disease.

RICHARD LAKE. (*Jour. Laryng., Rhin. and Otol.*, Jan. 1903.) The prominent symptom in this case had been intense dysphagia, for which reason the epiglottis had been amputated over four weeks ago by means of the galvanic-cautery snare. When removed it was found to be nearly half an inch thick where cut through, and the posterior or laryngeal surface was deeply ulcerated. The rest of the larynx was diseased, and had not yielded entirely to treatment, but the stump of the epiglottis was soundly healed and of normal thickness. Dysphagia ceased immediately after the operation, and did not recur. The general condition of the patient was markedly improved since he had been able to take his food in comfort.

Pedunculated Laryngeal Growth, Probably Dating from Birth, in a Boy Aged Fifteen Years.

o DOLAN. (*Jour. Laryng. Rhin. and Otol.*, Jan., 1903.) There were two growths present. The large one probably began as a papilloma arising from the upper surface of the anterior part of the left vocal cord, and had in the course of years become fibrous and pedunculated. The smaller tumour was sessile, subglottic, and situated immediately below the anterior commissure. The mother thought the affection dated from birth, as from the first he had had a peculiar hoarse cry, and in voice had always been hoarse. The large growth and

its peduncle in each inspiration was drawn through the glottis which they momentarily filled almost completely. The influence of this respiratory obstruction, acting through so many years, showed itself in the stunted and anemic appearance of this youth, while the other members of his family were healthy and well grown.

A Case of Cancer of the Larynx Cured by the X-Rays.

W. SCHEPPEGRELL (*N. Y. Med. Journal*, Dec. 9, 1902) reports that the patient was 57 years old, and that for six months he had been hoarse. Examination of the larynx showed a tumor of the left wall revolving vocal cord. A month later ulceration had set in, with profuse expectoration and much pain. Twenty daily applications of X-ray were used—(a high tension Tesla coil and tube with medium vacuum-platinum reflector at distance of seven inches from neck—ten minutes each sitting).

The improvement was not immediate, except pain disappeared, but two weeks after cessation of treatment, all ulceration had been relieved, expectoration ceased and patient was preparing to resume his profession three months later. There had been no recurrence.

Harris.

Laryngectomy for Malignant Disease.

FRANK HARTLEY (*N. Y. Med. Journal*, Dec. 13 and 20, 1901) discusses the subject exhaustively, reporting five cases, all successfully operated upon. In three of these cases there had been no recurrence at the end of four years. One was a recent case and one died 18 months later with deep seated cervical metastasis. In three of the five cases, the voice had been preserved.

Harris.

Tuberculous Laryngitis.

J. CLARENCE SHARP (*N. Y. Med. Journal*, Feb. 7, 1903) is a believer in the value of very conservative local treatment. In seven cases treated, two by creosote injection, three by creosote and morphine internally, and two by morphine alone internally, the best results followed the internal use of creosote and morphine.

He divides the ulcerations into two classes "first, cases where the ulceration is confined to the true cords, ventricular bands and interarytenoid commissure without infiltration of the surrounding structures. Second, cases with ulcer-

ation of arytenoids. aryepiglottic fold, true cords and ventricular bands, with infiltration or infiltration without ulceration."

He believes the prognosis for the first class is good even on Manhattan Island. For the second, removal to a high altitude is the only chance, and if extensive ulceration exists death will occur in three to six months. Such cases should not be sent away.

The writer calls attention to the possibility of mixed infection. He recognizes also the possibility of a simple hyperplasia of the interarytenoid commissure, occurring in pulmonary phthisis. (This view is at variance with that held by most observers, viz: that all laryngeal inflammation in tubercular patients is to be regarded as tubercular.—Reviewer.)

Sharp uses for the cases without marked infiltration of the arytenoid and ary-epiglottic folds larger doses of creosote internally and with more success—even as high as 50 drops of beechwood creosote, t.i.d. well diluted. He advises against any spraying of the larynx. *Harris.*

V.—MISCELLANEOUS.

The Involvement of the Concha and Larynx in Hemiatrophia Faciei.

KORNER. (*Zeitsch. f. ^{II}Ohrenh.*, 41 Bd.) The author observed a case of monolateral atrophy of the face, with especial involvement of the corresponding concha. At the same time an atrophy and fixation of the corresponding vocal cords in the median position was observed, which was manifested only in loss of the singing power. *Levy.*

Experiments in the Action of Suprarenal Extract on the Mucous Membrane of the Upper Air Passage, in External Application.

BUKAFZER (*Arch. f. Laryngol.*, Bd. 13) used the preparation isolated by Takamine in carrying out the physiologic experiments. He found that its action was limited to the capillaries at the point of application. The veins and arteries were emptied only when the layer covering them was re-

moved, and then centrally from the point of application. It was thus proven that the capillaries possess an active power of contraction. He was able to watch microscopically these changes on the web of the frog. *Levy.*

Anesthesin.

A. SPIERS. (*Muenchener. Med. Wochen.*, 1902, 39.) Anesthesin is a new local anesthetic related to orthoform. It is almost insoluble in water, but easily in alcohol and ether. Taken internally it is non-poisonous in doses up to 2 grams. It does not cause the complete anesthesia of cocain, but its effect lasts hours and even days, and also occurs without loss of substance. It is very well adapted for postoperative treatment. The author thinks that in addition to its anesthetic properties it hastenes the healing. In 3,000 cases orthoform caused a severe eczema in 12 and anesthesin in only one case. Insufflated in the form of powder, it had a favorable action on whooping cough and often cut fresh colds short. In postoperative treatment of the pharyngeal, palatal or lingual tonsils, and in the larynx, it eased the pain and shortened the period of healing. *Levy.*

The Choice of a General Anesthetic in Nose, Throat and Ear Operations.

THOS. J. GALLAHER, Denver, Col. (*Jour. Amer. Med. Assoc.*, Mar. 21., 1903.) The author has found bromide of ethyl to be very satisfactory for throat operations. It produces anesthesia in about one minute, which anesthesia lasts from two to five minutes. The amount required varies from one to four drams, according to age. The entire quantity to be given is thrown on a towel or in an inhaler, placed over the patient's nose and mouth, and no air is admitted except in case of asphyxiation. Anesthesia is complete in about one minute, by which time the breathing is stertorous. In adults it requires a larger dose and more time. A temporary vasomotor dilatation occurs and vomiting frequently follows. It should be administered when the stomach is empty. One death in 5228 narcoses has been reported. Only pure bromide of ethyl should be used. *Richards.*

The Early Appearances, Diagnosis and Treatment of Tuberculosis of the Upper Air Tract.

WALTER F. CHAPPELL, New York. (*Jour. Amer. Med.*

Assoc., Feb. 21, 1903.) The author has observed in cases seen at the Loomis Sanitarium that the mucous membrane of the soft palate, larynx and pharynx is extremely pale, and this condition has remained from two to six years without any deposit in the upper air tract.

Pharyngeal tuberculosis he regards as usually secondary to pulmonary or laryngeal tuberculosis; cases, however, do occur in which tubercle bacilli are present and the manifestations of tubercular pharyngitis undoubted, but in which examination of the lungs does not reveal any disease. In one such instance the kidneys were the seat of the tubercular process. At the beginning of pharyngeal tuberculosis the mucous membrane has first a pearly-gray, tense appearance and is later covered with minute yellow spots; small ulcerations then appear, later coalesce, finally leaving large irregular ulcerating surfaces.

He thinks considerable can be done medicinally in these cases of tuberculosis of the upper air tract. He is opposed to the use of any irritative applications during any active process, relying entirely upon soothing and cleansing sprays and applications of iodoform and fluid benzoïn, the benzoïn preparations being of special value on account of their property of clinging to the mucous membrane for hours. During the period of quiescence the ulcerations may be treated with solutions of lactic acid of varying strength. The curette is not a good instrument, inasmuch as after its use there is frequently swelling and an apparent extension of the disease, and he now employs the curette only for the relief of dyspnea and dysphagia in advanced cases, for the removal of the tumefied tissue, and for the scraping of ulcerations during the quiescent period. In the latter case he uses a dull curette after cleansing and cocainizing the surface, taking care not to cause any bleeding. He has known a number of throat infections entirely arrested by climatic measures alone. Residence near the sea or any large body of inland water is a bad place for tubercular throats. *Richards.*

Acute General Infections Originating in the Lymphoid Tissue of the Upper Respiratory Tract.

HENRY L. SWAIN, New Haven, Conn. (*Philadelphia Medical Journal*, Dec. 13, 1902.) The author regards many

of the febrile attacks of children that come on in the late afternoon or evening with temperature varying from 102 to 104, and extreme restlessness, lasting for several days, and followed by a condition of general anemia and debility, due to acute infectious inflammation of the pharyngeal tonsil. This may occur in children who under normal conditions are nose-breathers and whose adenoid tissue is not necessarily completely obstructive. These cases, he thinks, are frequently wrongly diagnosed; in fact, the absolute cause is entirely overlooked by the family physician, who thinks of beginning infectious disease or pneumonia, or examines the blood for typhoid or malaria. Accompanied by this condition is a cervical adenitis and considerable obstruction of nasal respiration.

Richards.

Removal of Foreign Body From the Esophagus.

R. J. WARD, East Barrington, N. H. (*American Medicine.*) The foreign body was a fish bone lodged in the esophagus, just below the larynx. In the absence of any probang, a snarl of grocer's twine was swallowed and then withdrawn. The fish bone became caught in this, and on the removal of the twine came back with it. The bone was an inch long.

Richards.

Social Hygiene and Social Politics.

STEINER (*Wiener Med. Blätter*, Nov. 28, 1902) has examined the statistics in the children's division in the Polyclinic in Vienna, and has come to the following conclusions: The results of serum treatment have been as favorable during the past twelve months as in any other year. Variations in mortality do not occur now as in the ante-serum period. The duration of the disease is shorter than formerly, about 8 days on the average. Complications and sequelae are much rarer, and are of a more benign nature. The mortality is relatively slight, 6.3 per cent. From the use of concentrated serum, the occurrence of unpleasant accidents after the injection of the serum is avoided.

Goodale.

A Case of Nevus Involving the Uvula, Palate, Fauces, Tongue and Larynx.

P. H. ABERCROMBIE. (*Jour. of Laryng., Rhin. and Otol.*, Jan., 1903.) Miss M. P—, aged eighteen years, attended the Central Throat, Nose and Ear Hospital on April

19 last complaining of "sore throat," especially on the left side, of a few days' duration.

Examination at once revealed a nevoid condition of the left side of the throat, involving half the uvula, the soft palate, the anterior pillar of the fauces, the side of the tongue, the epiglottis, and arytenoid region. There was also a red patch on the right anterior faucial pillar, and another on the under surface of the tongue.

The left tonsil was slightly inflamed, and this, no doubt, was the cause of her sore throat. For this a mixture of salicylate of soda and potassium bromide was prescribed, and speedy relief followed in a few days.

She was frequently troubled with similar sore throats, and the left side was always the worse. The naevus had been known to exist for the last sixteen years, and her mother said that it had increased in area during that period. It was discovered accidentally by her mother, who happened to look into her mouth one day.

There was often slight difficulty in swallowing, which was worse at the monthly periods. There was no family history of nevi; the patient's mother suffered from "rheumatic" pains. The general health was good; she had had measles twice, at five and seven years of age, whooping cough when between two and three years old, and scarlet fever ten years ago. The patient was shown as illustrating an interesting and not very common throat affection.

A Case of Paralysis of the Abductors of the Vocal Cords and of the Palatal Muscles, and Slight Paresis of the Tongue.

DUNDAS GRANT. (*Jour. Laryng., Rhin. and Otol.*, Jan., 1903.) J. W—, aged twenty-five, was first seen in March, 1900, on account of cough and groaning sound when in bed. The condition had lasted two or three months, and had come on after an attack of hiccough lasting on and off for about ten days. He had had a cough on and off for about one year, especially when drinking quickly. For six months he had occasional stridor on inspiration. Examination of the throat revealed slight paresis of the right half of the palate, but no abnormality in the movements of the tongue. The vocal cords approximated during phonation, but on inspiration the vocal processes did not move

from the middle line. There was, however, an elliptical slit between the cords. The case was obviously one of paralysis of the abductors and internal tensors of both cords and paresis of half the palate, and the lesion was therefore, in all probability, one of the vagus nerves in or near the medulla oblongata.

In seeking for a cause, especially for any signs of syphilis, there were found enlarged post-cervical glands of about six months' duration, and a flat ulcer on the scalp of the parietal region, with slightly indurated edges. This was asserted to have been in existence for nearly three or four months, but it seems more probable that it preceded the enlargement of glands. There was also general enlargement of the lymphatic glands over the body. The pulse almost disappeared during inspiration; the knee-jerks were normal. An antisymphilitic course of treatment was instituted, and when seen a fortnight later it was reported that there was less noise in sleep since the second occasion on which the mercurial ointment was rubbed in; the vocal slit appeared to be rather wider during inspiration. There was some degree of mercurial stomatitis.

The patient disappeared from the observation of the reporter, but returned again a fortnight ago—namely, more than two years after being first seen—on account of great difficulty and marked inspiratory stridor, also such a degree of paralysis of the palate that fluids usually regurgitated through the nose when he drank, while his speech was so indistinct that he was obliged to pinch his nostrils in order to make himself understood at all. The protrusion of the tongue into the right cheek was not quite so strong as into the left; he was unable to channel the tongue, but was not aware of ever having been able to do this. He stated that under the previous course of treatment he recovered sufficiently to be able to attend to his work as a butcher; he was at present, however, unable to do so. He was again placed on antisymphilitic treatment, and when seen a week later reported slight improvement in the breathing and greater ease in speaking. At his last visit he drew attention to the fact that he had a difficulty in raising his left arm, but he had left the out-patient department before an investigation of this symptom had been made. It remains to be seen

whether or not this is due to paralysis of the muscles supplied by the spinal accessory. The reporter would be glad to have suggestions as to the possible source of infection, as there is nothing to give color to the idea that it is hereditary, and there is no history of genital infection. It seems possible that the ulcer on the head was developed at the site of the primary sore, but the early development of the nervous symptoms would in that case be remarkable.

A Case of Obscure Lardaceous-looking Variable Infiltration of the Uvula, Soft Palate, and Right Arytenoid Cartilage.

FELIX SEMON. (*Jour. Laryng., Rhin. and Otol.*, Jan. 1903.) The patient was first seen on July 12 of the present year, with a history of long-standing throat trouble and occasional difficulty in swallowing. She had been seen by various medical men, all of whom, according to her statements, had considered the affection as rather serious, but had apparently not known what to make of it.

On examination, an almost lardaceous condition of the uvula was seen; that is to say, the uvula and the adjacent parts of soft palate were considerably infiltrated, and at the same time quite smooth to sight and touch, whilst the most characteristic point consisted in the peculiar yellowish color of the affected parts, reminding one of nothing so much as of the appearance of a kidney which had undergone lardaceous degeneration. In the larynx there was a similar condition of the mucuous membrane over the right arytenoid cartilage. The left looked slightly more edematous, reminding one of the ordinary pseudo-edematous infiltration of tuberculosis; still, although more transparent than its fellow, it had a similar yellow color to the right arytenoid.

There was no evidence of kidney trouble, but on examination of the legs there was slight pitting on pressure, particularly over the external malleoli.

Her voice was normal. There was no pain, and no difficulty in breathing. The organs of the chest were normal.

The urine had been examined later and found perfectly normal. On July 14, 1902, the local condition of both pharynx and larynx was much better than three days previously. The patient was given an arsenic and iron mixture.

On July 29, 1902, the swelling both of the uvula and of

the right arytenoid cartilage was much more marked than on the occasion of her last visit, and the color was much more the characteristic lardaceous yellow which had been observed on the occasion of the first examination. The condition apparently varied from day to day.

On November 6, 1902, the patient was found to have been distinctly better since last seen, and had only occasionally had slight difficulty in swallowing. The uvula as well as the right arytenoid cartilage now looked much less infiltrated than they were in July.

Remarking on this case Sir Felix Semon said: "This is the third case of the kind which I have ever seen, and I am not aware that the condition has ever been described.

"My first case, which I saw very many years ago, occurred in the wife of a practitioner in the Midlands; the lady's age was about thirty. In her case the condition was much more marked and general than in the present one, and I at first thought that it was a case of tuberculous infiltration, distinguished only from the ordinary cases by the peculiar yellow color of the affected parts, as the infiltration involved not only the uvula and soft palate, but also the epiglottis and both arytenoid cartilages. In that case the general discomfort and the difficulties in swallowing were much greater than in the present case, and no method of treatment had any effect whilst the patient was under periodical observation, which extended over nearly two years. I was, therefore, not a little surprised when again, about two years afterward, the patient called on me to show me that there had been a return to perfectly normal conditions. There was as little known cause for the restoration to health as there had been for the original affect on.

"The third case, which also occurred in a lady, aged about forty, I only saw once. In that case the conditions were very much as in the patient now shown.

"I cannot make the least suggestion as to the pathology of these cases, and bring my case forward with the double purpose of giving the members of the Society the opportunity of seeing these most unusual conditions, and of possibly obtaining some help with regard to its pathology and treatment."

Case of Epithelioma of Tongue.

HAMILTON BURT. (*Jour. Laryng., Rhin. and Otol.*, Jan. 1903.) Patient first noticed a depression under the right side of tongue in February last, about the size of a pin's head. It appeared as though the part had been punched out or sucked in. On the floor of the depression she noticed a small white deposit. She took little notice of it. It grew very slowly, and was painless. She sought advice about three months ago, and was advised to have some stumps and bad teeth in the vicinity of the growth removed. This was done, but no improvement was noticed. Dr. Burt had first seen the patient about four weeks ago; the growth was then the size of a small cherry, and occupied the right side and upper part of the middle of the tongue; the base was indurated, and the surface smooth, not ulcerated, with a few tiny yellow spots scattered here and there, out of which, when squeezed, a yellowish fluid escaped. No enlarged glands could be felt. Taking into consideration the age of the patient, the appearance of the growth, and the absence of enlarged glands, she was put upon iodide of potassium and mercury iodide, being increased to half a drachm three times a day. Under this treatment the growth became considerably reduced at first, but in spite of the increased doses of iodide it had increased rapidly during the past ten days. The patient had not lost flesh.

On the Local Action of Tri-Chlor-Acetic Acid.

SCHWABE, Breslau. (*Archives of Otology* Vol. XXXI, No. 5.) Trichloracetic acid, when applied to the mucous membrane of the nose or the tonsils, produces a superficial effect, which does not extend to the deeper layers of the cellular tissue, unless the action of the acid is supported by mechanical measures (repeated rubbing). Owing to its property of destroying the epithelium, it is an excellent means for bringing about closure of old perforations of the Mt.

After galvano-cauterization, application of the acid clears the openings of the epithelial crypts, glandular ducts, etc., and thus acts as a protective against bacteria.

In nasal hydrops, e. g., hay fever, on account of being non-irritating, it gives excellent results by mechanical confining the secretion, through closing the glandular ducts on the epithelium and perhaps also on the basement membrane.

Campbell.

BOOK NOTICES.

Text Book of Diseases of the Eye.

By Prof. L. Jacobson and L. Blau. 3rd Edition of Jacobson's text book. Leipsig. Printed by Geo. Thieme, 1902.

A third edition of Jacobson's well known text book on diseases of the ear has appeared. The author has had Blau help him in order to be able to review the enormous literature of the last 5 years. In this way it was possible for the author to collect in the narrow confines of a text book everything that belongs to otology. Certain chapters, e. g., that which treats of the complications of otitis media suppurativa have been almost entirely rewritten on account of the rapid development of that subject in the last few years. The thoroughness of the book, its wide survey and the precise form, the impartial, purely scientific critique of the opinions of other authors are completely retained. Of special importance to the general practitioner is the treatment in a special chapter of the aural complications of constitutional diseases like measles, scarlet fever, diphtheria, influenza, pneumonia, diabetes, etc. The specialist will find especial value in the completeness of the contents, the exact and careful description of all technique and operation procedures and the convenient and complete literature. Jacobson's text book will certainly add an increased number of friends to the already large number.

LEVY.

Hygiene of the Ear in Health and Disease.

Prof. Haug. Published by G. H. Moritz, Stuttgart.

In the list of books on Hygiene given out by Rubner is one from the pen of the head of Munich university policlinic for diseases of the ear, Prof. Haug. This is of interest not only to the laity, for whom it was originally intended, but also for the physician, even the otological specialist. It comprises in 100 pages in a concise but entertaining manner what ought to be known about the ear in health and disease. The anatomy and physiology are treated in two introductory chapters. In section III the author lays special stress on the importance of hearing in the mental development of the

child as well as for the adult in relation to his surroundings in active life, but especially on the great danger of suppuration of the ear. While one chapter contains the pathology of ear diseases six are devoted to prophylaxis. The author gives in minute details the dietetic regulations which the aural patient must observe, as well as the technique of syringing, catheterization on whose correct performance much stress is laid. The patient would be spared many ill consequences and the physician much worry if this chapter would be read carefully. In the last three sections the author treats of inherited difficulty in hearing, the relationship of ear disease, insurance and deaf mutism. In the interest of the numerous ear patients, we wish the book a wide circulation. LEVY.

The Nose and Throat in Medical History.

By Jonathan Wright M. D., Brooklyn, N. Y., 8 vo. Cloth and Gold, 250 pages, 10 illustrations. Price \$2.00 net. Published by the Laryngoscope Co.

Jonathan Wright has done a great deal in the literature of laryngology which in more ways than one has elevated the American side of the subject. It is fair to say however that he has written nothing better than *The Nose and Throat in Medical History*. He is particularly effective in this work, affording as it does an unusual opportunity for his well known faculty of critically surveying the field of his work.

The plan upon which he constructs his history is particularly happy. Each division of the subject is considered separately.

Thus the main groupings are Egyptian Medicine, Chaldean Medicine, Medicine of the Parsees, Medicine of the Talmud, Hindoo Medicine, Præ-Hippocratic treatises from Hippocrates to Celsus, Roman Medicine, Celsus and the Præ-Galenic writers, Galen, Greek writers of the Eastern Empire, the Arabians, the Præ-Renaissance period, the Renaissance, the Reformation and the diffusion of Medical Science, The result of the Renaissance, Intranasal Surgery and Pathology of the Seventeenth and Eighteenth Centuries, The Nineteenth Century, Prælaryngoscopic Era, the Laryngoscope, Problems of the present.

With such a classification as a frame work it is clear at a glance that the work is a distinct contribution to the literature of the Nose and Throat and should therefore find a place in the library of every one who devotes his time to the study and practice of laryngology.

